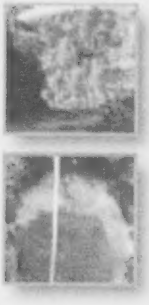
Forest Ecosystem Classification for Nova Scotia

Part I: Vegetation Types
(2010)



prepared by
Nova Scotia Department of Natural Resources

REPORT FOR 2011-1

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Peter Neily, Sean Basquill, Eugene Quigley, Bruce Stewart, Kevin Keys
Nova Scotia Department of Natural Resources
Renewable Resources Branch

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Forest Ecosystem Classification for Nova Scotia, Part I: Vegetation Types (2010)

Prepared by the Nova Scotia Department of Natural Resources
authors: Peter Neily[1], Sean Basquill[2], Eugene Quigley[1], Bruce Stewart[1], Kevin Keys[1]
Nova Scotia Department of Natural Resources, Renewable Resources Branch

[1]Forestry Division, Truro
[2]Wildlife Division, Kentville

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Introduction

In 2000, the Nova Scotia Department of Natural Resources (NSDNR) began a long-term project to systematically identify and describe stand-level forest ecosystems in Nova Scotia – known as the Forest Ecosystem Classification (FEC) project. To date, over 1,500 FEC plots have been assessed throughout the province using a detailed sampling and assessment protocol (Keys et al. 2007). This has resulted in several publications describing regional forest vegetation types, soil types and ecosites (Keys et al. 2003; Neily et al. 2006, 2007; Keys 2007).

In 2010, results from 10 years of FEC project work were synthesized to produce a comprehensive provincial FEC guide which is presented in three documents: *Forest Ecosystem Classification for Nova Scotia: Part I Vegetation Types (2010)*; *Part II Soil Types (2010)*; and *Part III Ecosites (2010)*. This three-part guide builds upon, but also supersedes, all earlier FEC publications.

Questions arising from use of provincial FEC guides should be directed to the Ecosystem Management Group, Forestry Division, NSDNR. Issues pertaining to biodiversity and conservation can be directed to the Wildlife Division, NSDNR. All FEC guide documents are subject to revision and update on a periodic basis. Users should check the NSDNR website for current editions of FEC component guides. The N.S. Provincial Habitat Classification is currently under development and will provide further information on wildlife values and features.

Why Classify Forest Ecosystems

At a landscape level, ecosystem classification provides a framework for landscape analysis and planning which can then be ecologically linked to operational (stand-level) planning and management (Sims et al. 1995). NSDNR has already produced a comprehensive ecological landscape classification (ELC) system for Nova Scotia (Neily et al. 2005). This hierarchical system begins with ecozone and moves through ecoregions, ecodistricts, ecosections and finally ecosites – the level where the ELC and FEC systems converge.

At a stand level, classifying forest ecosystems based on vegetation, soil and site attributes allows users to recognize similar ecosystem units on the ground and to develop a common understanding of these units (Baldwin and Meades 1999; Ponomarenko and Alvo 2001). This allows for ongoing development of guidelines and best management practices which recognize opportunities and constraints associated with different ecosystem units, thereby leading to more predictable and sustainable forest management.

FEC Definitions

Definitions for provincial FEC units are given below. A glossary (Appendix A) contains definitions for other ecological terms found in this guide.

Forest Groups are groups of forest vegetation types (VTs) with similar species composition, site conditions and successional pathways. These groups assist in the classification and presentation of unique VTs.

Vegetation Types are recurring and identifiable forest plant communities which reflect differences in site conditions, disturbance regimes and/or successional stage.

Variants are used to distinguish less common stands from the "typic" or average VT condition (based on minor variations in species composition or site features). Relative to differences among VTs, features used to define variants have weaker ecological and classification significance.

Soil Types are soils differentiated based on texture, drainage, fertility and depth; all of which influence site productivity and other management interpretations.

Phases are used to identify features within a soil type which are important for management interpretations, but which do not warrant establishment of a separate unit.

Ecosites are units which represent ecosystems that have developed under a variety of conditions and influences, but which have similar moisture and nutrient regimes. An ecosite is associated with a finite range of soil and site conditions and a finite range of VTs that grow naturally under those conditions.

Ecosite Groups represent ecoregion and ecodistrict units with similar climate conditions which can be grouped for FEC purposes. Two ecosite groups have been identified, the Acadian group and Maritime Boreal group (See *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details on ecosite groups).

About this Guide

This guide is part of the Nova Scotia FEC system. It describes all currently recognized forest groups and vegetation types (VTs) in the province along with successional development, coarse woody debris volume, and snag density interpretations. Although presented as a separate document, this guide is designed to be used in conjunction with provincial soil type and ecosite guides to support ecosystem based, stand-level forest management in Nova Scotia.

Vegetation types were derived from 1,456 provincial FEC field plots sampled between 2000 and 2010. Data from an additional 102 non-FEC plots assessed by the Atlantic Canada Conservation Data Centre and NSDNR Wildlife Division were also used (Basquill 2001-2008; Basquill and Benjamin 2009). Vegetation divisions and groupings were based on statistical analysis (Hill 1979) and expert opinion. A total of 14 forest groups, 88 VTs and 22 variants have been identified to date (Tables 1 and 2).

Table 1. Summary of forest groups, vegetation types (VTs) and variants within the provincial forest ecosystem classification (FEC) system

Forest Group	Forest Group Code	Number of VTs	Number of Variants
Cedar Forest	CE	2	1
Coastal Forest	CO	7	1
Floodplain Forest	FP	6	1
Highland Forest	HI	4	1
Intolerant Hardwood Forest	IH	7	3
Karst Forest	KA	2	0
Mixedwood Forest	MW	5	1
Old Field Forest	OF	5	0
Open Woodland	OW	6	0
Spruce Hemlock Forest	SH	10	1
Spruce Pine Forest	SP	10	5
Tolerant Hardwood Forest	TH	8	4
Wet Coniferous Forest	WC	8	3
Wet Deciduous Forest	WD	8	1
Total	**14**	**88**	**22**

TABLE 2. Vegetation types (VTs) and their associated ecosite groups (AC = Acadian, MB = Maritime Boreal)

VT Code	VT Name	AC	MB
CE1	Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum	X	
CE1a	(Poison ivy variant)	X	
CE2	Eastern white cedar - Balsam fir / Stair-step moss	X	
CO1	Black spruce - Balsam fir / Foxberry / Plume moss		X
CO2	White spruce - Balsam fir / Foxberry / Twinflower		X
CO2a	(Black crowberry Headland variant)		X
CO3	Red spruce / Mountain-ash / Foxberry		X
CO4	Balsam fir / Foxberry - Twinflower		X
CO5	White birch - Balsam fir / Foxberry - Wood aster		X
CO6	Red maple - Birch / Bunchberry - Sarsaparilla		X
CO7	White spruce / Bayberry		X
FP1	Sugar maple - White ash / Ostrich fern - Wood goldenrod	X	
FP2	Red maple - Red oak / Bellwort - Nodding trillium	X	
FP2a	(Sugar maple variant)	X	
FP3	Red maple / Sensitive fern - Rough goldenrod	X	
FP4	Balsam poplar - White spruce / Ostrich fern - Cow-parsnip	X	
FP5	Black cherry - Red maple / Rough goldenrod - Jack-in-the-pulpit	X	
FP6	White spruce / Wood goldenrod / Shaggy moss	X	
HL1	Balsam fir / Mountain-ash / Large-leaved goldenrod		X
HL1a	(White birch / Wood sorrel variant)		X
HL2	White spruce / Wood aster		X
HL3	Yellow birch - Balsam fir / Eastern spreading wood fern - Wood sorrel		X
HL4	Birch / Wood fern - Wood sorrel		X
IH1	Large-tooth aspen / Lambkill / Bracken	X	
IH1a	(Red oak variant)	X	
IH2	Red oak - Red maple / Witch-hazel	X	
IH2a	(Red oak variant)	X	
IH3	Large-tooth aspen / Christmas fern - New York fern	X	
IH4	Trembling aspen / Wild raisin / Bunchberry	X	
IH5	Trembling aspen - White ash / Beaked hazelnut / Christmas fern	X	

VT Code	VT Name	AC	MB
IH6	White birch - Red maple / Sarsaparilla - Bracken	X	
IH6a	(Aspen variant)	X	
IH7	Red maple / Hay-scented fern - Wood sorrel	X	
KA1	Hemlock / Christmas fern - White lettuce - Wood goldenrod	X	
KA2	Sugar maple / Christmas fern - Rattlesnake fern - Bulbet bladder fern	X	
MW1	Red spruce - Yellow birch / Evergreen wood fern	X	
MW2	Red spruce - Red maple - White birch / Goldthread	X	
MW2a	(Aspen variant)	X	
MW3	Hemlock - Yellow birch / Evergreen wood fern	X	
MW4	Balsam fir - Red maple / Wood sorrel - Goldthread	X	
MW5	White birch - Balsam fir / Starflower	X	
OF1	White spruce / Aster - Goldenrod / Shaggy moss	X	X
OF2	Tamarack / Speckled alder / Rough goldenrod / Shaggy moss	X	X
OF3	White pine - Balsam fir / Shinleaf - Pine-sap	X	
OF4	Balsam fir - White spruce / Evergreen wood fern - Wood aster	X	X
OF5	Trembling aspen - Grey birch / Rough goldenrod - Strawberry	X	
OW1	Jack pine / Huckleberry / Black crowberry / Reindeer lichen	X	X
OW2	Black spruce / Lambkill / Reindeer lichen	X	X
OW3	Red spruce / Red-berried elder / Rock polypody	X	
OW4	Red pine - White pine / Broom crowberry / Grey reindeer lichen	X	
OW5	Red oak / Huckleberry / Cow-wheat - Rice grass / Reindeer lichen	X	
OW6	White birch - Red oak - White ash / Marginal wood fern - Herb-Robert	X	
SH1	Hemlock / Pin cushion moss / Needle carpet	X	
SH2	Hemlock - White pine / Sarsaparilla	X	
SH3	Red spruce - Hemlock / Wild lily-of-the-valley	X	
SH4	Red spruce - White pine / Lambkill / Bracken	X	
SH4a	(Red spruce variant)	X	
SH5	Red spruce - Balsam fir / Schreber's moss	X	
SH6	Red spruce - Balsam fir / Stair-step moss - Sphagnum	X	
SH7	White spruce - Red spruce / Blueberry / Schreber's moss	X	
SH8	Balsam fir / Wood fern / Schreber's moss	X	
SH9	Balsam fir - Black spruce / Blueberry	X	
SH10	White spruce - Balsam fir / Broom moss	X	

VT Code	VT Name	AC	MB
SP1	Jack pine / Bracken - Teaberry	X	X
SP1a	(Black spruce variant)	X	X
SP2	Red pine / Blueberry / Bracken	X	
SP2a	(Black spruce variant)	X	
SP3	Red pine - White pine / Bracken - Mayflower	X	
SP3a	(Black spruce variant)	X	
SP4	White pine / Blueberry / Bracken	X	X
SP4a	(Black spruce variant)	X	X
SP4b	(Huckleberry variant)	X	X
SP5	Black spruce / Lambkill / Bracken	X	X
SP6	Black spruce - Red maple / Bracken - Sarsaparilla	X	X
SP7	Black spruce / False holly / Ladies' tresses sphagnum	X	X
SP8	Black spruce - Aspen / Bracken - Sarsasparilla	X	
SP9	Red oak - White pine / Teaberry	X	
SP10	Tamarack / Wild raisin / Schreber's moss	X	
TH1	Sugar maple / Hay-scented fern	X	
TH1a	(Beech variant)	X	
TH1b	(Yellow birch variant)	X	
TH2	Sugar maple / New York fern - Northern beech fern	X	
TH2a	(Yellow birch variant)	X	
TH3	Sugar maple - White ash / Christmas fern	X	
TH4	Sugar maple - White ash / Silvery spleenwort - Baneberry	X	
TH5	Beech / Sarsaparilla / Leaf litter	X	
TH6	Red oak - Yellow birch / Striped maple	X	
TH7	Yellow birch - White birch / Evergreen wood fern	X	
TH8	Red maple - Yellow birch / Striped maple	X	
TH8a	(White ash variant)	X	
WC1	Black spruce / Cinnamon fern / Sphagnum	X	X
WC2	Black spruce / Lambkill - Labrador tea / Sphagnum	X	X
WC2a	(Huckleberry - Inkberry variant)	X	X
WC3	Jack pine - Black spruce / Rhodora / Sphagnum	X	X
WC3a	(Black spruce variant)	X	X

VT Code	VT Name	AC	MB
WC4	Red pine - Black spruce / Huckleberry - Rhodora / Sphagnum	X	
WC5	Red spruce - Balsam fir / Cinnamon fern / Sphagnum	X	X
WC6	Balsam fir / Cinnamon fern - Three seeded sedge / Sphagnum	X	X
WC7	Tamarack - Black spruce / Lambkill / Sphagnum	X	X
WC7a	(Huckleberry - Inkberry variant)	X	X
WC8	Hemlock / Cinnamon fern - Sensitive fern / Sphagnum	X	
WD1	White ash / Sensitive fern - Christmas fern	X	
WD2	Red maple / Cinnamon fern / Sphagnum	X	X
WD3	Red maple / Sensitive fern - Lady fern / Sphagnum	X	X
WD4	Red maple / Poison ivy / Sphagnum	X	X
WD4a	(Huckleberry - Inkberry variant)	X	X
WD5	Trembling aspen / Beaked hazelnut / Interrupted fern / Sphagnum	X	
WD6	Red maple - Balsam fir / Wood aster / Sphagnum	X	X
WD7	Balsam fir - White ash / Cinnamon fern - New York fern / Sphagnum	X	
WD8	Red spruce - Red maple / Wood sorrel - Sensitive fern / Sphagnum	X	

Users of earlier regional guides will note that VT naming has changed for the 2010 provincial guide. This was necessary to accommodate the increased number of units found across the province and to facilitate the use of identification keys. It was also desirable to standardize naming protocols from those used in the regional guides. Appendix B contains synonomy tables listing old regional guide VT names and new 2010 equivalents.

Using this Guide

Vegetation keys based on overstory tree species and selected ground vegetation have been developed to aid forest group and Vegetation Type (VT) identification (Figures 1 and 2). Where necessary, site features are also used to aid classification. These keys are designed for use in relatively intact, mature stands (minimum 40 years). However, managed stands can still be assessed as long as users recognize that tree species abundance and diversity may have been altered by silviculture treatments. Younger stands that have reached free-to-grow status can also be assessed, but adjacent older stands on similar sites and soils should be used to confirm results. Plantations are currently excluded from the VT classification system.

Vegetation keys are best used between June and October when understory vegetation is most easily identified. However, since these keys rely mainly on trees and understory species that are identifiable year-round (excluding times with snow coverage), they may be used outside of the ideal season (with appropriate care).

Vegetation keys are designed to be used in sequence. Users first determine forest group using the forest group key (Figure 1). This directs the user to a section of the vegetation type key (Figure 2). Beginning at the top of the appropriate forest group proceed through the key. Each step (number) in both keys involves two decision points labelled a. and b.. Read each statement and choose the one which best fits the stand condition. This statement will lead to another pair of statements or to the name of the forest group or vegetation type. To reduce the likelihood of errors, users are reminded to pay close attention to cover class definitions and thresholds used in the keys.

Once a VT has been keyed out, users should consult the appropriate VT fact sheet to verify the decision. If the fact sheet does not represent the stand being sampled, the unit should be re-assessed. Borderline conditions associated with decision points within the keys could lead to more than one possible VT determination. Therefore, fact sheets should be consulted to make the final call. It is also recognized that some stands may be a complex of more than one VT. In these cases, it is appropriate to list each VT rather than assign an "average" condition.

There are no set rules for sampling intensity when determining VTs. Often one plot is all that is required, but it is important to select a representative area. This will require a quick walk through to be sure the area selected for assessment is typical of the stand. If assessment is part of a systematic cruise, VT can easily be determined at each prism point.

Finally, users of this guide are reminded that information on soil types is also required for complete stand assessment. Benefits from using the FEC system can only be fully realized when both vegetation and soil types are assessed. Users should refer to *Forest Ecosystem Classification for Nova Scotia: Part II Soil Types (2010)* for more details on soil type assessment and interpretation.

Notes:

- Although there are over 100 VTs and variants currently recognized in the FEC system, most users of this guide will only work with (and need to recognize) a fraction of these units. There are several VTs which are regional in nature and/or relatively uncommon.

- For FEC purposes, the province has been divided into two main ecosite groups (Acadian and Maritime Boreal) which are associated with different ELC regions and potential climax species associations. Most VTs are only associated with one of these ecosite groups, but some can be found in either (Table 2). (See *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details on ecosite groups).

Terminology and Conventions

Terms used to describe forest group and VT features are defined in Appendix A. For clarification and context, additional information on some of these terms is provided below.

Edatopic Grid

An edatopic grid is a two-dimensional diagram used to plot ecosystems (and subsequently ecosites) with respect to their relative moisture and nutrient regimes.

Moisture Regime

Soil moisture regime represents average moisture availability for plant growth. It is assessed by integrating moisture supply (as related to climate) with soil drainage and moisture holding capacities. In general, very dry to dry moisture regimes are associated with severe to moderate moisture deficits; fresh to moist moisture regimes are associated with little to no moisture deficits; and wet moisture regimes are associated with excess moisture during the growing season (See *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details).

Nutrient Regime

Soil nutrient regime represents the relative availability of nutrients for plant growth. Determination of nutrient regime requires consideration and integration of several environmental features including forest floor humus form, soil type, seepage class and ground water characteristics (see *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details).

Percent Cover

Percent cover is given by the vertical projection of tree crown or plant shoot area as a percentage of stand area (Dunster and Dunster, 1996). Percent cover is readily determined for understory species by looking downward and estimating the amount of ground covered as a percentage of the total plot area. For tree species, the user must look upward through the canopy and estimate ground cover from below. It is possible for species cover within a layer of overlapping vegetation to total more than 100%. Charts to aid estimation of percent cover are given in Appendix C.

Forest versus Woodland

In this guide, forests have sites which can (and normally do) support a minimum of 30% crown closure by trees. Open woodlands are upland sites where natural disturbances (e.g. frequent fires) and/or site conditions (e.g. sandy soils, excessive surface stoniness, bedrock exposures) generally limit the establishment of trees to less than 30% crown closure. In some cases, open woodlands containing hardwoods (especially red oak) can have more than 30% crown closure despite having low tree densities. These sites may still meet the definition of open woodland with respect to VT determination.

Overstory and Understory Vegetation

Overstory refers to trees which occupy the dominant, co-dominant and intermediate canopy positions. Understory vegetation is grouped into three categories:

Shrub layer: Woody shrubs and regenerating trees usually less than 2 m in height, but occasionally taller.

Herb layer: Dwarf woody plants plus ferns, club mosses and other herbaceous plants.

Bryophytes and Lichens: Mosses, liverworts and lichens.

Karst Sites

In general terms, karst topography refers to surface and subsurface features created by the dissolving of soluble gypsum, limestone or dolomite bedrock (Cauboue et al. 1996). Sinkholes and caverns are common expressions of karst topography. In this guide, Karst Forest (KA) sites are limited to those which have gypsum or limestone/dolomite bedrock exposures in addition to sinkholes and caverns. It has been determined through field sampling that Karst VTs are well correlated with the presence of near-surface bedrock – the influence of which has not been reduced by deep glacial till deposits.

Vegetation Fact Sheets

The following sections contain fact sheets describing 14 forest groups and 88 VTs (with 22 variants). Below is a summary of information found in each forest group and VT fact sheet.

Forest Group Fact Sheet

1. The **forest group code** and **name** is found at the top of the fact sheet along with the **number of plots (n)**.
2. A **concept** paragraph provides key characteristics that define the forest group.
3. A **vegetation** paragraph describes dominant plants which characterize the forest group.
4. An **environmental setting** paragraph describes general site features and geographic information associated with the forest group.
5. A **successional dynamics** section describes natural disturbance regimes, disturbance agents and general successional status of VTs within the forest group.
6. An **edatopic grid** (or grids) shows the range of moisture and nutrient regime conditions covered within the forest group.
7. A **list of vegetation types** found within the forest group.
8. An **ecological features** section provides special interest information on the forest group landscape setting, stand characteristics, special habitats and/or wildlife use.

Vegetation Type Fact Sheets

1. The **VT code** and **name** are found at the top of the fact sheet along with the **number of plots (n)**. Species used in VT names provide an insight into site conditions and successional status for each unit, but not necessarily species abundance.
2. A stand **photograph** is used to give a visual representation of the VT.
3. A **concept** paragraph provides key characteristics that define the VT.
4. A **vegetation** paragraph describes dominant plants in the VT by layer.
5. An **environmental setting** paragraph describes general site features and geographic information associated with the VT.
6. A **successional dynamics** section outlines VT successional status, disturbance agents and links to other vegetation types.
7. An **ecological features** section provides special interest information on VT landscape setting, stand characteristics, special habitats and/or wildlife use.

8. A **characteristic plants** list provides information on the most common plants found during field sampling.

Freq. (%)	percentage of plots where species was found
Cover (%)	mean percent cover in plots where species was found
Mean % Cover	mean percent cover of all species in each layer

A complete list of common and scientific names used in this guide are found in Appendix D.

9. **Distinguishing features** describes the best site and plant features needed to identify the VT.

10. **Site characteristics** summarize VT site data collected during field sampling. (See *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details.)

11. **Soil characteristics** summarize VT soil data collected during field sampling. (*See Forest Ecosystem Classification for Nova Scotia: Part II Soil Types (2010)* for more details.)

12. A **distribution map** shows ELC ecodistricts (Appendix E) where the VT has been sampled (green) and where it has not been sampled but is likely to occur (yellow). White areas represent ecodistricts where the VT is not likely to occur.

Notes:

- In some cases, data were not collected for particular features and these are recorded as **nd** (no data) in site summaries.
- Distribution maps are based on ecodistrict boundaries, however only certain sites within these ecodistricts support the VT described (based on site and soil features).

Vegetation Keys

Vegetation keys are designed to be used in sequence. Users first determine forest group using the forest group key (Figure 1). This directs the user to a section of the vegetation type key (Figure 2). Beginning at the top of the appropriate forest group proceed through the key. Each step (number on the left) in both keys involves two decision points labeled a. and b. Read each statement and choose the one which best fits the stand condition. This statement will lead to another pair of statements or to the name of the forest group or vegetation type. To reduce the likelihood of errors, users are reminded to pay close attention to cover class definitions and thresholds used in the keys. Once a VT is determined, consult the appropriate fact sheet to verify the decision.

Figure 1. Key to the forest groups of Nova Scotia

In this key, **tree cover** refers to the relative percent cover. (i.e. the percentage of total overstory cover)

Ground vegetation cover refers to the absolute percent cover. (i.e. the total area covered on the ground)

Cover Classes: **Sparse** < 10% **Scattered** 10-25 % **Abundant** 26-50% **Dominant** >50%

1a. Eastern white cedar present (excluding ornamental escapes) .... CEDAR FOREST (CE)

1b. Eastern white cedar absent 2

2a. Stands on poorly to very poorly drained soils with mainly hydrophytic vegetation. Common indicator plants include black spruce, tamarack, Labrador tea, leatherleaf, winterberry, cinnamon fern, sensitive fern, creeping snowberry, crested wood fern and sphagnum. 3

2b. Stands on rapidly to imperfectly drained soils that are seldom if ever temporarily flooded and with little or no hydrophytic vegetation. Common indicator plants include red spruce, white pine, red pine, hemlock, sugar maple, yellow birch, red oak, wild lily-of-the-valley, starflower, bunchberry, sarsaparilla, bracken, teaberry, wood ferns and hay scented fern.......................... 4

3a. Stands with ≥75% softwood in the overstory .... WET CONIFEROUS FOREST (WC)

3b. Stands with <75% softwood in the overstory .... WET DECIDUOUS FOREST (WD)

4a. Stands on old fields and pastures .... OLD FIELD FOREST (OF)

4b. Stands not on old fields and pastures 5

5a. Stands adjacent to rivers and subject to regular or periodic flooding .... FLOODPLAIN FOREST (FP)

5b. Stands that are not regularly or periodically flooded 6

6a. Stands located in Coastal or Highland Ecoregions 7

6b. Stands not located in Coastal or Highland Ecoregions 8

7a. Stands usually restricted to high elevations of the Cape Breton Plateau and characterized by balsam fir and various amounts of white birch, white spruce and heart-leaf birch. . . . HIGHLAND FOREST (HL)

7b. Stands associated with cool and moisture laden maritime winds and usually found within 1km of the coast or on coastal islands. . . . . COASTAL FOREST (CO)

8a. Stands on karst topography with bedrock exposures. . . . . KARST FOREST (KA)

8b. Stands not on karst topography with bedrock exposures. 9

9a. Stands in an open woodland condition . . . . OPEN WOODLAND (OW)

9b. Stands not in an open woodland condition 10

10a. Stands with ≥75% softwood in the overstory 11

10b. Stands with <75% softwood in the overstory 12

11a. Black spruce and/or pines dominant . . . . .SPRUCE - PINE FOREST (SP)

11b. Black spruce and/or pines not dominant . . . . SPRUCE - HEMLOCK FOREST (SH)

12a. Stands with ≥ 25% softwood in the overstory . . . . .MIXEDWOOD FOREST (MW)

12b. Stands with < 25% softwood in the overstory 13

13a. Stands dominated by a combination of successional hardwoods (large-tooth aspen, trembling aspen, white birch, red oak, red maple) . . . . INTOLERANT HARDWOOD FOREST (IH)

13b. Stands dominated by northern hardwoods (sugar maple, yellow birch, beech, white ash, ironwood) alone, or in combination with red maple, white birch, red oak or aspen . . . . .TOLERANT HARDWOOD FOREST (TH)

Wood frog

Figure 2. Key to the forested vegetation types of Nova Scotia

In this key, **tree cover** refers to the relative percent cover. (i.e. the percentage of total overstory cover)

Ground vegetation cover refers to the absolute percent cover. (i.e. the total area covered on the ground)

Cover Classes: **Sparse** < 10% **Scattered** 10-25 % **Abundant** 26-50% **Dominant** >50%

CEDAR FOREST (CE)

1a. Stands on poorly and very poorly drained soils
. . . . **CE1** Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum
1b. Stands on rapid to imperfectly drained soils. . . . . . **CE2** Eastern white cedar – Balsam fir / Stair-step moss

COASTAL FOREST (CO)

1a. Softwoods ≥75% 2
1b. Softwoods <75% 6
2a. Black spruce abundant to dominant . . . .**CO1** Black spruce – Balsam fir / Foxberry / Plume moss
2b. Black spruce absent to scattered 3
3a. White spruce abundant to dominant 4
3b. White spruce absent to scattered 5
4a. Stands on marine sands and dunes . . . . **CO7** White spruce / Bayberry
4b. Stands not on marine sands and dunes . . . . **CO2** White spruce – Balsam fir / Foxberry / Twinflower
5a. Red spruce scattered to dominant . . . . **CO3** Red spruce / Mountain-ash / Foxberry
5b. Balsam fir dominant . . . .**CO4** Balsam fir / Foxberry – Twinflower
6a. Softwood ≥25% . . . . **CO5** White birch – Balsam fir / Foxberry – Wood aster
6b. Softwood <25% . . . .**CO6** Red maple – Birch / Bunchberry – Sarsasparilla

FLOODPLAIN FOREST (FP)

1a. Hardwoods dominant 2
1b. Hardwoods not dominant 6
2a. Sugar maple, yellow birch and/or ash dominant
. . . . **FP1** Sugar maple – White ash / Ostrich fern – Wood goldenrod
2b. Sugar maple, yellow birch and/or ash not dominant 3
3a. Red oak and/or maples dominant 4

3b. Red oak and maples not dominant 5

4a. Red oak scattered to dominant . . . . **FP2** Red maple – Red oak / Bellwort – Nodding trillium

4b. Red oak absent or sparse . . . . **FP3** Red maple / Sensitive fern – Rough goldenrod

5a. Balsam poplar scattered to dominant . . . **FP4** Balsam poplar – White spruce / Ostrich fern – Cow parsnip

5b. Black cherry scattered to dominant. . . **FP5** Black cherry – Red maple / Rough goldenrod – Jack in the pulpit

6a. Red spruce and/or hemlock dominant. . . . . Refer to SPRUCE – HEMLOCK FOREST (SH)

6b. White spruce abundant to dominant . . . . **FP6** White spruce / Wood goldenrod / Shaggy moss

HIGHLAND FOREST (HL)

1a. Hardwoods ≥75%. . . . . **HL4** Birch / Wood fern / Wood sorrel

1b. Hardwoods <75%. 2

2a. Softwoods ≥75% 3

2b. Softwoods <75% . . . . **HL3** Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel

3a. Balsam fir the most common softwood. . . . . **HL1** Balsam fir / Mountain-ash / Large-leaved goldenrod

3b. White spruce the most common softwood . . . . **HL2** White spruce / Wood aster

INTOLERANT HARDWOOD FOREST (IH)

1a. Aspen abundant to dominant (often with red oak or white ash). 2

1b. Aspen absent to scattered. 5

2a. Large-tooth aspen abundant to dominant. 3

2b. Trembling aspen abundant to dominant 4

3a. Bracken, lambkill and other ericaceous plants abundant . . . . . **IH1** Large-tooth aspen / Lambkill / Bracken

3b. Bracken, lambkill and other ericaceous plants absent to sparse

. . . . **IH3** Large-tooth aspen / Christmas fern – New York fern

Vernal pool,
Silver Mine,
Cape Breton County

4a. White ash absent .... **IH4** Trembling aspen / Wild raisin / Bunchberry

4b. White ash sparse to abundant .... **IH5** Trembling aspen – White ash / Beaked hazelnut / Christmas fern

5a. Red oak absent to scattered 6

5b. Red oak abundant to dominant .... **IH2** Red oak – Red maple / Witch-hazel

6a. Red maple and white birch dominant .... **IH6** White birch – Red maple / Sarsaparilla – Bracken

6b. Red maple dominant 7

7a. Yellow birch scattered .... **TH8** Red maple – Yellow birch / Striped maple

7b. Yellow birch absent to sparse .... **IH7** Red maple / Hay-scented fern – Wood sorrel

KARST FOREST (KA)

1a. Stands with ≥ 25% softwood in the overstory
.... **KA1** Hemlock / Christmas fern – White lettuce – Wood goldenrod

1b. Stands with < 25% softwood in the overstory
.... **KA2** Sugar maple / Christmas fern – Rattlesnake fern – Bulbet bladder fern

MIXEDWOOD FOREST (MW)

1a. Spruces are the most common softwood species 2

1b. Spruces are not the most common softwood species 5

2a. Black spruce is the most common softwood species 3

2b. Black spruce is not the most common softwood species 4

3a. Red maple scattered to abundant .... **SP6** Black spruce – Red maple / Bracken – Sarsasparilla

3b. Aspen scattered to abundant .... **SP8** Black spruce – Aspen / Bracken – Sarsasparilla

4a. Yellow birch and/or sugar maple are the most common hardwoods
.... **MW1** Red spruce – Yellow birch / Evergreen wood fern

4b. Red maple, white birch and/or aspen are the most common hardwoods
.... **MW2** Red spruce – Red maple – White birch / Goldthread

5a. Hemlock is the most common softwood .... **MW3** Hemlock – Yellow birch / Evergreen wood fern

5b. Hemlock is not the most common softwood 6

6a. Red oak and white pine are dominant .... **SP9** Red oak – White pine / Teaberry

6b. Red oak and white pine are not dominant 7

7a. Red maple is the most common hardwood ... **MW4** Balsam fir – Red maple / Wood sorrel – Goldthread

7b. White birch is the most common hardwood .... **MW5** White birch – Balsam fir / Starflower

OLD FIELD FOREST (OF)

1a. White spruce and/or tamarack dominant 2

1b. White spruce and/or tamarack not dominant 3

2a. Tamarack absent to scattered . . . . **OF1** White spruce / Aster – Goldenrod / Shaggy moss

2b. Tamarack abundant to dominant. . . . . **OF2** Tamarack / Speckled alder / Rough goldenrod / Shaggy moss

3a. White pine dominant. . . . . **OF3** White pine – Balsam fir / Shinleaf – Pine-sap

3b. White pine not dominant 4

4a. Balsam fir dominant. . . . . **OF4** Balsam fir – White spruce / Evergreen wood fern – Wood aster

4b. Aspen dominant . . . . **OF5** Trembling aspen – Grey birch / Rough goldenrod – Strawberry

OPEN WOODLAND (OW)

1a. Stands on talus 2

1b. Stands not on talus 3

2a. Softwoods dominant. . . . . **OW3** Red spruce / Red-berried elder / Rock polypody

2b. Hardwoods dominant . . . . **OW6** White birch – Red oak – White ash / Marginal wood fern – Herb-Robert

3a. Softwoods dominant. 4

3b. Hardwoods dominant . . . . **OW5** Red oak / Huckleberry / Cow-wheat – Rice grass / Reindeer lichen

4a. Jack pine present. . . . . **OW1** Jack pine / Huckleberry – Black crowberry / Reindeer lichen

4b. Jack pine absent 5

5a. Black spruce abundant to dominant . . . . **OW2** Black spruce / Lambkill / Reindeer lichen

5b. Red pine abundant to dominant . . . **OW4** Red pine – White pine / Broom crowberry / Grey reindeer lichen

SPRUCE – HEMLOCK FOREST (SH)

1a. Hemlock and/or white pine dominant 2

1b. Hemlock and/or white pine not dominant 3

2a. White pine absent or sparse . . . . **SH1** Hemlock / Pin cushion moss / Needle carpet

2b. White pine scattered to dominant . . . . **SH2** Hemlock – White pine / Sarsaparilla

3a. Red spruce and hemlock dominant . . . . **SH3** Red spruce – Hemlock / Wild lily-of-the-valley

3b. Red spruce and/or other softwoods dominant 4

4a. White pine scattered to abundant, hemlock absent . . . **SH4** Red spruce – White pine / Lambkill / Bracken

4b. White pine absent or sparse 5

5a. White spruce scattered to dominant 6

5b. White spruce absent or sparse................................. 7

6a. White spruce and red spruce dominant .... **SH7** White spruce – Red spruce / Blueberry / Schreber's moss

6b. White spruce and balsam fir dominant .... **SH10** White spruce – Balsam fir / Broom moss

7a. Red spruce and balsam fir dominant 8

7b. Red spruce and balsam fir not dominant........................ 9

8a. Sphagnum moss ≤1% .... **SH5** Red spruce – Balsam fir / Schreber's moss

8b. Sphagnum moss >1%.................. **SH6** Red spruce – Balsam fir / Stair-step moss – Sphagnum

9a. Balsam fir abundant to dominant 10

9b. Tamarack abundant to dominant..................... **SP10** Tamarack / Wild raisin / Schreber's moss

10a. Black spruce absent or sparse .... **SH8** Balsam fir / Wood fern / Schreber's moss

10b. Black spruce scattered to abundant...................... **SH9** Balsam fir – Black spruce / Blueberry

SPRUCE – PINE FOREST (SP)

1a. Pines scattered to dominant 2

1b. Pines absent or sparse 6

2a. Jack pine and black spruce dominant .... **SP1** Jack pine / Bracken – Teaberry

2b. Jack pine and black spruce not dominant 3

3a. Red pine and black spruce dominant.......................... **SP2** Red pine / Blueberry / Bracken

3b. Red pine and black spruce not dominant....................... 4

4a. Red oak scattered to abundant .... **SP9** Red oak – White pine / Teaberry

4b. Red oak absent to sparse.................................... 5

Winterberry

5a. White pine and black spruce dominant . . . . **SP4** White pine / Blueberry / Bracken

5b. Red pine and white pine dominant . . . . **SP3** Red pine – White pine / Bracken – Mayflower

6a. Black spruce dominant 7

6b. Black spruce not dominant 8

7a. Sphagnum absent or sparse, shrubs primairly ericaceous species. . . . **SP5** Black spruce / Lambkill / Bracken

7b. Sphagnum scattered to abundant, shrubs primairly non-ericaceous species
. . . . **SP7** Black spruce / False holly / Ladies' tresses sphagnum

8a. Black spruce scattered to abundant. 9

8b. Black spruce absent or sparse 10

9a. Red maple is the most common hardwood . . . . . **SP6** Black spruce – Red maple / Bracken – Sarsasparilla

9b. Aspen are the most common hardwood . . . .**SP8** Black spruce – Aspen / Bracken – Sarsasparilla

10a. White spruce abundant to dominant . . . . **SH10** White spruce – Balsam fir / Broom moss

10b. Tamarack abundant to dominant. . . . .**SP10** Tamarack / Wild raisin / Schreber's moss

TOLERANT HARDWOOD FOREST (TH)

1a. Northern Hardwoods (sugar maple, beech, yellow birch, white ash, ironwood) >60% of overstory with other hardwoods, if present, in low abundance 2

1b. Stands not as above with scattered to abundant red oak and/or, white birch, aspen and/or red maple. 7

2a. White ash, ironwood, silvery spleenwort and hairy sweet cicely absent or nearly so. Stands usually on upper and mid slopes (dry to fresh/moist sites) 3

2b. At least one of the above species present. Stands usually associated with seepage sites except when on richer parent material such as basalt enriched till 6

3a. Beech dominant . . . . **TH5** Beech / Sarsaparilla / Leaf litter

3b. Beech absent to abundant. 4

4a. Yellow birch the most common northern hardwood with sugar maple and beech absent or nearly so 8

4b. Not as above 5

5a. Dry to fresh soils where the fern layer is usually dominated by a combination of Hay-scented fern and wood ferns with little or no New York fern and northern beech fern
. . . . **TH1** Sugar maple / Hay-scented fern

5b. Fresh to fresh/moist soils where the fern layer suggests increased soil moisture and species like New York, northern beech fern, oak fern are more common
. . . . **TH2** Sugar maple / New York fern – Northern beech fern

6a. Silvery spleenwort, ostrich fern and hairy sweet cicely absent
. . . . **TH3** Sugar maple – White ash / Christmas fern

6b. At least one of the above species is present
. . . . **TH4** Sugar maple – White ash / Silvery spleenwort – Baneberry

7a. Red oak scattered to abundant . . . . **TH6** Red oak – Yellow birch / Striped maple

7b. Red oak absent or sparse 7

8a. White birch scattered to abundant. Yellow birch the most common northern hardwood with sugar maple and beech absent or scattered . . . . . . **TH7** Yellow birch – White birch / Evergreen wood fern

8b. Red maple scattered to abundant. Yellow birch the most common northern hardwood with sugar maple and beech absent or scattered . . . . **TH8** Red maple – Yellow birch / Striped maple

WET CONIFEROUS FOREST (WC)

1a. Tamarack abundant to dominant. . . . . **WC7** Tamarack – Black spruce / Lambkill / Sphagnum

1b. Tamarack absent to scattered 2

2a. Black spruce and/or pines abundant to dominant 3

2b. Black spruce and/or pines absent to scattered 7

3a. Pines absent or sparse 4

3b. Pines scattered to dominant 6

4a. Shrub layer cover exceeds herb layer cover 5

4b. Herb layer cover exceeds shrub layer cover . . . . **WC1** Black spruce / Cinnamon fern / Sphagnum

5a. Shrubs primarily ericaceous species . . . . **WC2** Black spruce / Lambkill – Labrador tea / Sphagnum

5b. Shrubs primarily non-ericaceous species . . . . **SP7** Black spruce / False holly / Ladies' tresses sphagnum

6a. Jack pine and black spruce dominant . . . . **WC3** Jack pine – Black spruce / Rhodora / Sphagnum

6b. Red pine and black spruce dominant . . **WC4** Red pine – Black spruce / Huckleberry – Rhodora / Sphagnum

7a. Red spruce abundant to dominant . . . . **WC5** Red spruce – Balsam fir / Cinnamon fern / Sphagnum

7b. Red spruce absent to scattered 8

8a. Balsam fir abundant to dominant . . . **WC6** Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum

8b. Hemlock abundant to dominant . . . . **WC8** Hemlock / Cinnamon fern – Sensitive fern / Sphagnum

WET DECIDUOUS FOREST (WD)

1a. Stands with < 25% softwood in the overstory 2

1b. Stands with ≥ 25% softwood in the overstory 6

2a. White ash abundant to dominant .... **WD1** White ash / Sensitive fern – Christmas fern

2b. White ash absent to scattered 3

3a. Red maple abundant to dominant 4

3b. Trembling aspen abundant to dominant
.... **WD5** Trembling aspen / Beaked hazelnut / Interrupted fern / Sphagnum

4a. Atlantic Coastal Plain flora present........................ **WD4** Red maple / Poison ivy / Sphagnum

4b. Atlantic Coastal Plain flora absent 5

5a. Stands with understory plants indicating enriched conditions (sensitive fern, lady fern,
dwarf raspberry, violets, jewelweed) .... **WD3** Red maple / Sensitive fern – Lady fern / Sphagnum

5b. Stands with the above species absent or nearly so, indicating a poorer condition,
cinnamon fern usually >10% cover with the following upland species (bunchberry,
bracken, teaberry) often present .... **WD2** Red maple / Cinnamon fern / Sphagnum

6a. White ash absent... 7

6b. White ash sparse to scattered
.... **WD7** Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum

7a. Balsam fir is the most common softwood ...... **WD6** Red maple – Balsam fir / Wood aster / Sphagnum

7b. Spruce are the most common softwood
.... **WD8** Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum

Blue cohosh

Forest Groups & Vegetation Types

CE

Cedar Forest Group

(n = 16)

CE1 Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum .... **CE1a** Poison ivy variant

CE2 Eastern white cedar – Balsam fir / Stair-step moss

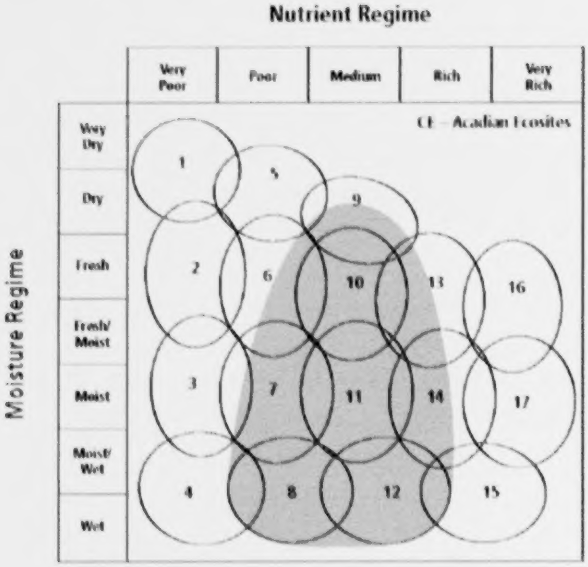
Concept: The presence of eastern white cedar (in any stand or site condition) defines this group. Only two broadly described Vegetation Types (VT) are currently recognized, one each in an upland and wetland setting. Diverse and well developed shrub, herb and bryophyte layers are typical. It is known that cedar can also occur on alluvial floodplain soils, shallow to bedrock soils and old field sites. Fact sheets for these units will be developed as more data are collected. Vegetation types in this group are found only in the Acadian Ecosite group.

Vegetation: Cedar, red maple, white ash, balsam fir and black spruce are common associates in the canopy. Understory vegetation reflects soil moisture and nutrient regimes present. The greatest diversity occurs on wet sites and in western Nova Scotia where Atlantic Coastal Plain flora are more common. Cedar regeneration is usually present in both VTs.

Environmental Setting: Vegetation types in this group are usually found on lower flats, lower and toe positions of gentle slopes, shallow depressions and old river terraces. Most sites have little (if any) surface stoniness or exposed bedrock. Soils are generally derived from glacial till, fluvial and/or organic deposits. Site fertility is usually moderate to high. Vegetation types only form small patches on the landscape. This uncommon group is mainly found in the Western ecoregion (700) with a few scattered locations known in the Northumberland Lowlands (530) and Cumberland Marshes (550) ecodistricts. Old field cedar forests are known on the North Mountain ecodistrict (920). Cedar on alluvial soils are scattered along the Annapolis River and small tributaries. Cedar on shallow soils over bedrock are scattered along the Valley Slope ecodistrict (710).

Successional Dynamics: Successional dynamics of cedar VTs in Nova Scotia are not fully understood. Cedar is a shade tolerant species and can regenerate and persist in the understory until openings allow further development. Between stand-level disturbance events, natural tree senescence should promote uneven age class development.

Edatopic Grid


Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
Wet
CE – Acadian Ecosites
1
5
9
2
6
10
13
16
3
7
11
14
17
4
8
12
15

Ecological Features

Occurrences of this small patch ecosystem rarely cover a hectare. The overstory is typically well developed, composed of cedar and other tree species. Cedar stands are clustered in two different areas of the province; a small group of stands are found in the northern mainland, while the remainder occurs in the western counties. These geographically isolated sub-populations show little evidence of genetic interaction and it is unclear whether they were once continuous or whether their separation has been long standing, resulting from different post glacial migration events. Cedar trees are relatively long lived and very resistant to disease, insects and decay. The foliage and bark of young trees are a favoured browse of several herbivores, including deer, snowshoe hare and porcupine. Wetter stands in western Nova Scotia often support Atlantic Coastal Plain flora, including some rare species. Cedar is legally protected and listed as vulnerable under the Nova Scotia Endangered Species Act.

Oxford Junction,
Cumberland County

CE1

Eastern white cedar / Speckled alder / Cinnamon fern /Sphagnum

Thuja occidentalis / Alnus incana / Osmunda cinnamomea / Sphagnum spp.

CE1a

Poison ivy variant

Toxicodendron radicans

n=10

Concept: This mid to late successional ecosystem is the only wet cedar forest found in Nova Scotia. The very uncommon Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum forest is characterized by cedar canopy dominance and moderate to high levels of sphagnum. CE1a, the poison ivy variant, is typified by species with Atlantic Coastal Plain affinity (e.g. poison ivy, inkberry, Elliott's goldenrod, catbriar and others).

Vegetation: Canopy layers are well developed, with moderate to high levels of cedar and lesser amounts of red maple, black spruce and white ash. Woody understory and herbaceous layers are variably developed. Common species include speckled alder, winterberry, cinnamon fern and three seeded sedge. Occurrences of CE1a may include poison ivy, huckleberry, inkberry, skunk cabbage, Elliott's goldenrod, catbriar and/or button sedge, as well as other Atlantic Coastal Plain species. The typically dense bryophyte layer includes prominent common green sphagnum.

Environmental Setting: The Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum forest usually occurs on poorly to very poorly drained flats and depressions, scattered at low elevation across western and northern Nova Scotia. Most stands are supported by nutrient medium to rich organic soil, but poorly drained mineral soil also provides suitable habitat for this Vegetation Type (VT). Sites are moderately exposed with little microtopography or surface stoniness. In Yarmouth and Digby counties, lakeside stands can occur on elevated terraces or ridges called ice ramparts. These terraces are formed by the shoreward movement and pushing action of ice during winter freeze up. The VT is much more common in both New Brunswick and Prince Edward Island, although less so in the latter province. CE1a is not found outside Nova Scotia.

Successional Dynamics: Successional patterns of this mid to late successional Vegetation Type are not fully understood. Most occurrences are maintained by gap dynamics, but some stands show evidence of small-scale timber harvest, a disturbance agent that generally favours black spruce, balsam fir and/or tamarack regeneration. Windthrow, harvesting, flooding and ice scour are potential stand-level disturbance agents. Depending on the disturbance regime, site fertility and local seed sources, CE1 could transition from WD4 (Red maple / Poison ivy / Sphagnum) or WC7 (Tamarack – Black spruce / Lambkill / Sphagnum). Between major disturbance events, natural tree senescence promotes uneven age class development and related changes in stand structure.

Ecological Features

Occurrences of this small patch ecosystem rarely cover a hectare. The variably composed overstory provides moderate to dense canopy cover. Deer may browse cedar heavily in winter, while snowshoe hare eat the foliage and gnaw young treebark. Cedar are long-lived and resistant to disease and insects. The oldest Nova Scotia trees exceed 250 years. Cedar wood is very decay resistant resulting in dead trees that may persist for many decades. Cedar is legally protected and listed as vulnerable under the Nova Scotia Endangered Species Act.

Characteristic Plants	CE1 Freq. (%)	CE1 Cover (%)	CE1a Freq. (%)	CE1a Cover (%)
Eastern white cedar	100	51.8	100	41.6
Red maple	80	9.8	100	9.4
White ash	60	7.7	60	12.0
Balsam fir	60	6.7	40	4.0
Tamarack	60	5.7	20	12.0
Black spruce	40	12.0	80	20.5
Red spruce	20	0.1	80	5.5
White pine			40	5.0
Tree Layer (Mean Cover)		**81**		**83**
Balsam fir	80	10.3	60	6.4
Eastern white cedar	80	2.8	60	10.5
Red maple	80	0.5	80	4.0
Speckled alder	80	0.5	60	1.3
Winterberry	60	0.7	80	0.4
Labrador tea	60	0.2	20	0.1
Lambkill	60	0.2	20	0.1
Black spruce	40	8.0	40	0.6
False holly	40	0.1	20	1.0
Ground hemlock (Yew)	40	0.1		
Mountain-ash	40	0.1	20	1.0
Highbush blueberry	20	2.0	40	0.1
Bayberry	20	0.1	40	1.3
Poison ivy			80	2.3
Huckleberry			80	1.8
White ash			40	1.3
Shrub Layer (Mean Cover)		**17**		**33**
Cinnamon fern	100	25.0	100	11.4
Wild lily-of-the-valley	100	0.4	80	1.5
Twinflower	80	0.8		
Three seeded sedge	60	2.3	60	2.9
Sarsaparilla	60	2.2	40	2.8
Dwarf raspberry	60	1.0	20	1.0
Sensitive fern	60	0.7	20	0.5
Partridge berry	60	0.4	20	1.0
Creeping snowberry	60	0.1		
Oak fern	40	1.1		
Skunk cabbage	40	0.8	20	0.1
Fowl manna grass	40	0.5		
Massachusetts fern	40	0.5		
Bladder sedge	40	0.3		
Crested wood fern	40	0.1	20	1.0
Starflower	40	0.1	60	2.7
Bluebead lily	20	0.5	60	1.9
Royal fern	20	0.1	80	0.8
Blue flag			40	0.3
Trailing blackberry			40	0.2
Northern long sedge			40	0.1
Herb Layer (Mean Cover)		**34**		**12**
Common green sphagnum	80	12.0	60	17.3
Shaggy moss	80	1.9	20	0.1
Stair-step moss	60	31.3	20	0.5
Bazzania	60	3.7	60	3.5
Pale fat-leaved sphagnum	40	20.0	40	15.0
Brittle stem sphagnum	40	17.3		
Flat-topped sphagnum	40	7.0	20	6.0
Blunt-leaved sphagnum	20	2.0	40	3.5
Ladies' tresses	20	2.0	40	11.5
Bryo-Lichen Layer (Mean Cover)		**57**		**32**

Distinguishing Features

These are wet softwood forests with cedar. The variant, CE1a, displays a strong Atlantic Coastal Plain flora affinity in the understory. Species such as poison ivy, inkberry, Elliott's goldenrod and others are often present.

Poison ivy

Site Characteristics

Slope Position: Level^7 Depression^2 Lower^1

Surface Stoniness: (Non - Slightly)^8 (Moderately)^1 (Very - Excessively)^1

Bedrock Outcrop: (Non-rocky)^{10}

Elevation Range: 14 - 168m

Slope Gradient: Level^9 Moderate^1

Aspect: South^1 None^9

Exposure: Moderate^7 Mod. sheltered^2 Sheltered^1

Microtopography: Level^6 Slightly^2 Moderately^1 nd^1

Drainage: Very poor^5 Poor^4 nd^1

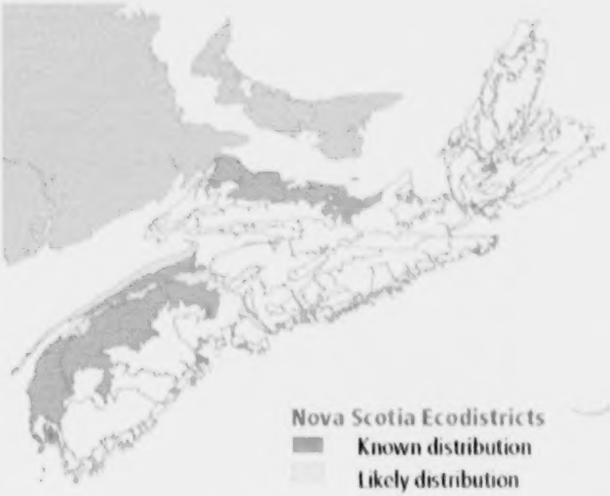
Soil Characteristics

Soil Type: ST14^9 ST4^1

Parent Material: Organic^9 Lacustrine^1

Rooting Depth (cm): (<30)^4 (30-45)^1 nd^5

Duff Thickness (cm): (21-40)^1 (>40)^9



Oxford Junction,
Cumberland County

CE2

Eastern white cedar – Balsam fir / Stair-step moss

Thuja occidentalis – Abies balsamea /
Hylocomium splendens

n=6

Concept: This mid-successional Vegetation Type (VT) has an overstory dominated by a range of species, but consistently includes a significant component of eastern white cedar. It is cedar's presence, in either the canopy or high shrub layer, which defines this otherwise variable VT. CE2 stands can be classed as either softwood or mixedwood depending on tree species composition. It is an uncommon VT and is the only upland cedar forest found in the province.

Vegetation: Eastern white cedar is a co-dominant with several other trees including red spruce, balsam fir, white pine, hemlock, red maple and white ash. Other less common associates are white birch, trembling aspen and white spruce. Development of the shrub layer is variable, but usually includes regenerating trees, beaked hazelnut and fly- honeysuckle. The herb layer is generally dominated by a variety of fern species including interrupted fern, bracken, lady fern, cinnamon fern and oak fern. These species are indicative of the range of moisture and nutrient conditions associated with CE2 stands. The well developed bryophyte layer is dominated by stair-step moss, Schreber's moss and bazzania.

Environmental Setting: CE2 is mainly associated with fresh-moist to moist, nutrient medium to rich soils of variable texture. CE2 is an uncommon VT that occurs mainly in western Nova Scotia in the Clare, Annapolis Valley and Valley Slope ecodistricts. It is also found scattered in northern Nova Scotia within the Northumberland Lowlands ecodistrict.

Successional Dynamics: CE2 is considered mid-successional, but successional patterns are not fully understood. As a shade-tolerant species, eastern white cedar will regenerate and persist in the understory until an opening in the canopy allows it to develop further. In the absence of a stand-level disturbance, it is likely that cedar will maintain itself as the dominant canopy species. An early successional stage of CE2 may be MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread). Depending on disturbance history CE2 can be even-aged, but it will develop uneven age class structures as it matures.

Ecological Features

Occurrences of this small patch ecosystem rarely cover a hectare. Cedar occurs as an intermediate sized tree in this closed canopy forest. Deer may browse cedar heavily in winter, while snowshoe hare will eat the foliage and gnaw young tree bark. Cedar are long-lived and resistant to disease and insects. The oldest Nova Scotia trees exceed 250 years. Cedar wood is very decay resistant resulting in dead trees than may persist for many decades. Cedar is legally protected and listed as vulnerable under the Nova Scotia Endangered Species Act.

Characteristic Plants	CE2 Freq. (%)	CE2 Cover (%)
Eastern white cedar	100	30.8
Balsam fir	83	6.4
Red spruce	67	11.5
Red maple	67	6.8
White pine	50	13.3
Hemlock	33	8.5
White ash	33	7.5
White birch	33	4.0
Sugar maple	33	3.5
Yellow birch	33	2.0
Trembling aspen	17	24.0
White spruce	17	16.0
Black spruce	17	2.0
Tree Layer (Mean Cover)		**69**
Balsam fir	100	4.1
Red maple	83	0.9
Red spruce	67	3.0
Eastern white cedar	50	6.3
Beaked hazelnut	50	1.8
Fly honeysuckle	33	1.8
Trembling aspen	33	1.5
Mountain maple	33	0.6
White ash	33	0.3
Serviceberry	33	0.2
Lambkill	33	0.1
Shrub Layer (Mean Cover)		**14**
Starflower	100	1.1
Wild lily of the valley	83	9.4
Sarsaparilla	83	0.7
Bracken	67	13.1
Goldthread	67	3.3
Twinflower	50	1.7
Bluebead lily	50	1.3
Interrupted fern	33	25.0
Cinnamon fern	33	9.0
Lady fern	33	5.8
Oak fern	33	2.5
Wood sorrel	33	1.0
Spinulose wood fern	33	0.8
Christmas fern	33	0.5
Dwarf raspberry	33	0.5
Partridge berry	33	0.5
Indian pipe	33	0.1
Mitrewort	33	0.1
Wood aster	33	0.1
Herb Layer (Mean Cover)		**40**
Stair step moss	100	14.2
Bazzania	100	7.1
Schreber's moss	83	17.3
Hypnum moss	67	2.2
Wavy dicranum	50	0.4
Shaggy moss	33	7.6
Broom moss	33	1.8
Ladies' tresses	33	1.0
Bryo-Lichen Layer (Mean Cover)		**43**

Distinguishing Features

Cedar is the key identifier for this well to imperfectly drained upland softwood and/or mixed forest. Cedar occurs in the canopy as a co-dominant or intermediate.

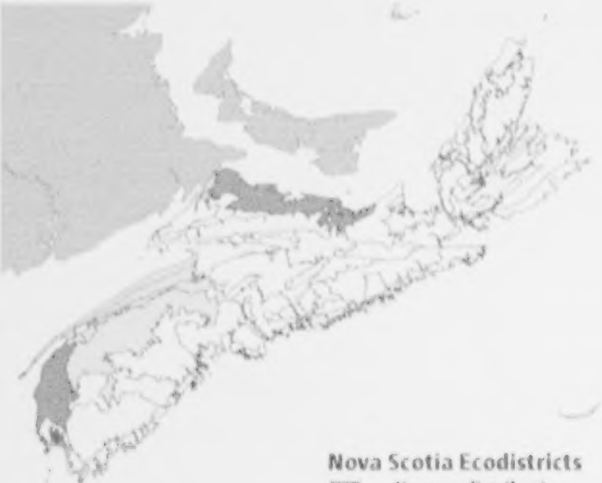
Cedar
(R.A. Howard @ USDA-NRCS PLANTS Database)

Site Characteristics

Slope Position:	Level^{3} Lower^{3} Upper^{3}
Surface Stoniness:	(Non - Slightly)^{7} (Moderately)^{3}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	16 - 44m
Slope Gradient:	Gentle^{5} Level^{2} nd^{3}
Aspect:	North^{2} South^{2} West^{2} None^{2} nd^{2}
Exposure:	Mod. sheltered^{6} Mod. exposed^{2} nd^{2}
Microtopography:	Moderately^{5} Slightly^{3} Strongly^{2}
Drainage:	Imperfect^{8} Moderately well^{2}

Soil Characteristics

Soil Type:	ST6^{3} ST12^{3} ST19^{2} nd^{2}
Parent Material:	Glacial till^{8} Alluvium^{2}
Rooting Depth (cm):	(30-45)^{6} (>45)^{2} nd^{2}
Duff Thickness (cm):	(0-5)^{2} (11-20)^{5} nd^{3}



Nova Scotia Ecodistricts

▨ Known distribution

▨ Likely distribution

CO

Coastal Forest Group

(n = 46)

CO1 Black spruce – Balsam fir / Foxberry / Plume moss
CO2 White spruce – Balsam fir / Foxberry – Twinflower . . **CO2a** Black crowberry Headland variant
CO3 Red spruce / Mountain-ash / Foxberry
CO4 Balsam fir / Foxberry – Twinflower
CO5 White birch – Balsam fir / Foxberry – Wood aster
CO6 Red maple – Birch / Bunchberry – Sarsaparilla
CO7 White spruce / Bayberry

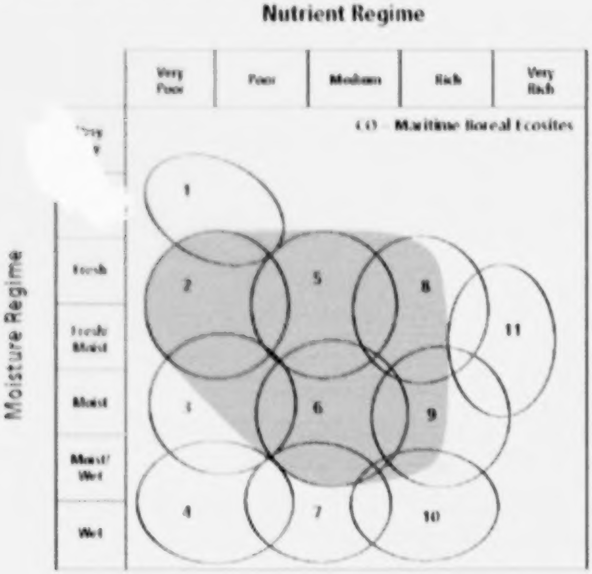
Concept: The composition and vigour of coastal forest Vegetation Types (VT) are influenced by cool, moist climate conditions and exposure associated with the Atlantic Coastal ecoregion and Bay of Fundy shore. These VTs have strong boreal affinities and are considered indicative of Maritime Boreal ecosites. Several plant species are used to indicate this maritime influence. Krummholtz and wave forest conditions are also known to occur in association with coastal VTs. The krummholtz condition is currently recognized as a variant, while more data are needed to characterize the wave forest condition. Acadian Ecosite VTs can sometimes be found in sheltered areas within coastal ecoregion boundaries, but these are not recognized as Coastal Forest group VTs.

Vegetation: Crown closure can vary within and between VTs of this group. Black spruce, white spruce and balsam fir are the main overstory species. Red maple and white birch will also reach the upper canopy on more sheltered or distant sites. A suite of plants can be used to indicate coastal influence including heart-leaf birch, mountain-ash, downy alder, bayberry and foxberry. Red spruce, sugar maple, beech, hemlock and to a lesser extent white pine are seldom found in the coastal forest group (except along the Bay of Fundy and Tusket Islands where red spruce is found).

Environmental Setting: Vegetation types are mainly found on upper and middle positions of gentle slopes. Soils are mainly derived from glacial till deposits and surface stoniness and exposed bedrock can be variable. Cool, moist climate conditions slow decomposition rates resulting in sites with unusually thick duff layers. Softwood dominated VTs form large patches or matrix forests on the landscape whereas hardwood dominated VTs form small to medium patches. This group is found throughout the Atlantic Coastal (800) ecoregion and along the Bay of Fundy shore, with scattered occurrences along the Northumberland Strait.

Successional Dynamics: Vegetation types in this group include both zonal and edaphic climax types. The most common disturbance agents are coastal winds and storms. The level of physical disturbance can be variable with both small and large patches of windthrow and breakage common. Balsam fir susceptibility to insects and disease is also increased in stands weakened by high winds. In more exposed areas, white spruce krummholtz or balsam fir wave forest conditions are found. In the absence of physical disturbance, natural senescence in both softwood and hardwood species limits stand age to 100 to 125 years.

Edatopic Grid



Ecological Features

These forests form large patch and matrix stands along the Atlantic and Fundy coasts. Cool temperatures, high winds, salt spray, and elevated humidity and fog are the strongest determinants of stand composition and structure. Most occurrences have dense canopies and well developed bryophyte layers. On more exposed sites, trees may be stunted and wind shorn; in extreme circumstances, krummholtz canopy structures can form. Outside the Cape Breton highlands ecoregion, these are the coldest forests in the province. Most have some boreal affinity, which may or may not be expressed in the understory. Coastal forests provide important habitat for many birds (e.g. black-crowned night heron, osprey, blackpoll warbler, sharp-tailed sparrow, fox sparrow), particularly for those that travel along the coast during spring and fall migration. Near-shore and island stands are used as nesting sites and roosts for great blue herons and seabirds. Older stands may support uncommon orchids and cyanolichens. There is low potential for this group to develop and sustain old growth conditions.

Second Lake, Halifax County

CO1

Black spruce – Balsam fir / Foxberry / Plume moss

Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Ptilium crista-castrensis

n=10

Concept: This edaphic climax Vegetation Type (VT) has an overstory dominated by black spruce and balsam fir. White spruce may also be common in western parts of the province. Coniferous tree species regeneration and moss cover are usually extensive. Black spruce – Balsam fir / Foxberry / Plume moss represents the dominant forest found on fresh-moist, nutrient poor coastal sites in Nova Scotia.

Vegetation: Black spruce and balsam fir are the dominant overstory trees, with lesser amounts of white spruce and tamarack. (White spruce may be more common in western Nova Scotia, where balsam fir cover is reduced.) Scattered red maple and white birch (if present) are typically in an intermediate canopy position. The shrub layer is dominated by regenerating balsam fir and/or black spruce along with lambkill. Other common shrub species include wild raisin, false holly and mountain ash. Herb layer diversity is low, with bunchberry, creeping snowberry and twinflower often dominant. Scattered foxberry can also be found, with cinnamon fern also common on wetter sites. Schreber's moss dominates the extensive bryophyte layer with lesser amounts of stair-step moss, bazzania and plume moss.

Environmental Setting: CO1 is mainly associated with fresh-moist to moist, nutrient poor soils of glacial origin. These soils are generally medium to coarse textured and are often stony. The majority of this VT is found in the Atlantic Coastal ecoregion. High winds and exposure limit tree height potential in CO1 stands. This VT likely occurs in coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

Successional Dynamics: This VT has nutrient poor soils that give rise to an edaphic climax community dominated by black spruce and balsam fir. The even-aged forest typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. In the absence of these types of disturbances, black spruce and balsam fir in this ecosystem are expected to live to about 100 years, after which tree senescence will initiate renewal through advanced regeneration. Due to its unique ecological setting, CO1 does not usually shift to other vegetation types after disturbance. However, on higher fertility sites, CO1 may succeed from (or revert to) CO4 (Balsam fir / Foxberry – Twinflower). Between stand-level disturbances, natural tree senescence can create uneven age class distribution and other stand structures.

Ecological Features

This closed canopy matrix forest is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. The forest's longevity is a function of either canopy tree senescence or the frequency of catastrophic stand disturbances (usually hurricanes). Stands near the coast or on islands are used as nesting sites and roosts for great blue herons and various seabirds. Coastal forests are often used by songbirds as they travel along the coast during spring and fall migration. Mature forests develop abundant old man's beard, a lichen that provides important nest material for warblers and other species, and winter food for deer grazing on fallen trees. Old, undisturbed stands with balsam fir may house the endangered boreal felt lichen and other uncommon cyanolichens.

Characteristic Plants	C01 Freq. (%)	C01 Cover (%)
Black spruce	100	25.4
Balsam fir	100	18.6
White birch	63	4.0
Tamarack	38	5.3
Red maple	25	5.0
White spruce	25	5.0
Tree Layer (Mean % Cover)		**51**
Balsam fir	100	11.1
Lambkill	100	3.6
Black spruce	100	2.0
Wild raisin	88	1.1
Mountain-ash	88	0.9
False holly	88	0.4
Velvet-leaf blueberry	63	0.3
White birch	50	0.3
Huckleberry	38	0.4
Lowbush blueberry	38	0.2
Serviceberry	38	0.1
Heart-leaf birch	25	0.8
Shrub Layer (Mean % Cover)		**20**
Bunchberry	100	3.6
Starflower	88	0.6
Wild lily-of-the-valley	75	0.7
Foxberry	75	0.1
Creeping snowberry	63	8.2
Bluebead lily	63	7.3
Twinflower	63	2.3
Bracken	63	1.9
Goldthread	63	0.9
Sarsaparilla	63	0.3
Cinnamon fern	25	6.0
Indian pipe	25	0.1
Mayflower	25	0.1
Herb Layer (Mean % Cover)		**20**
Schreber's moss	100	62.4
Stair-step moss	100	12.6
Bazzania	100	9.9
Plume moss	100	4.3
Wavy dicranum	88	3.1
Broom moss	75	1.9
Ladies' tresses	75	1.6
Cup lichens	63	0.3
Grey reindeer lichen	50	0.8
Hypnum moss	38	1.5
Naugehyde liverwort	25	0.6
Bryo-Lichen Layer (Mean % Cover)		**96**

Distinguishing Features

This coastal softwood forest has abundant black spruce in the overstory. Mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, though they are not always present. Extensive moss coverage and a thick duff layer characterize the forest floor.

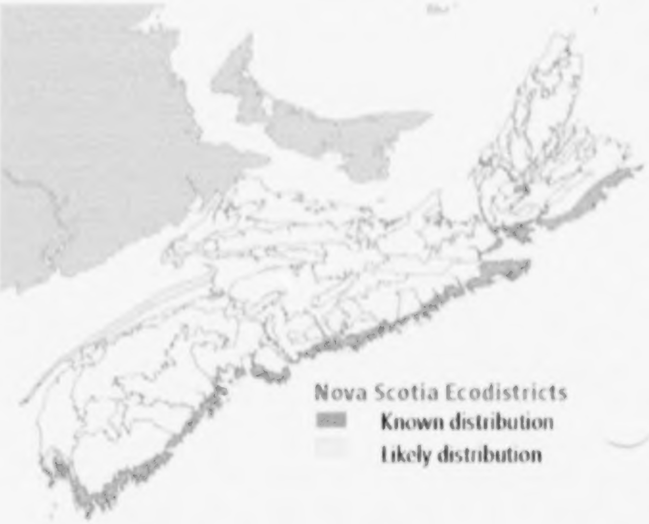
Plume moss

Site Characteristics

Slope Position:	Upper^{5} Middle^{1} Level^{2}
Surface Stoniness:	(Very - Excessively)^{4} (Non - Slightly)^{3} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{6} (Slightly - Moderately)^{1} (Very - Excessively)^{1}
Elevation Range:	8 - 116m
Slope Gradient:	Gentle^{5} Level^{2} Moderate^{1}
Aspect:	North^{4} East^{1} South^{1} West^{1} None^{1}
Exposure:	Exposed^{6} Mod. exposed^{2}
Microtopography:	Slightly^{6} Level^{2}
Drainage:	Imperfect^{7} Moderately well^{1}

Soil Characteristics

Soil Type:	ST3^{4} ST3-L^{1} ST6^{2} ST2-L^{1}
Parent Material:	Glacial till^{7} Till/Bedrock^{1}
Rooting Depth (cm):	(<30)^{7} (30-45)^{1}
Duff Thickness (cm):	(11-20)^{7} (21-40)^{1}



Colin's Cove, Richmond County

CO2

White spruce – Balsam fir / Foxberry – Twinflower

Picea glauca – Abies balsamea / Vaccinium vitis-idaea – Linnaea borealis

CO2a

Black crowberry Headland variant

Empetrum nigrum

n=6

Concept: This mid to late successional Vegetation Type (VT) has an overstory dominated by white spruce, with a component of balsam fir. Strong winds, salt spray and harsher climatic conditions, along more exposed headlands and shorelines, often create a severely stunted canopy structure called krummholtz. The CO2a variant defines a krummholtz vegetation type. White spruce – Balsam fir / Foxberry – Twinflower is scattered along the Nova Scotia coast and is typically closer to the shore than other VTs in this group.

Vegetation: White spruce is the dominant overstory tree along with balsam fir. Black spruce, white birch and red maple are minor associates. The shrub layer is often poorly developed, but includes mountain ash, wild raisin, false holly, blueberries and lambkill (along with regenerating balsam fir). The well-developed herb layer includes typical upland forest flora such as bunchberry, twinflower, wild lily-of-the-valley, wood sorrel and starflower. For the exposed CO2a variant, ground juniper, sweet gale, bayberry, chokeberry and black crowberry are also common. Schreber's moss and stair-step moss dominate the well-developed bryophyte layer.

Environmental Setting: CO2 is mainly associated with fresh-moist to moist, nutrient poor to nutrient medium soils of glacial origin. These soils are generally medium to coarse textured and potentially shallow to bedrock in some locations. This VT is mainly found near shorelines on exposed headlands, hills and ridges, as well as off-shore islands. High winds and salt spray limit tree height potential in this VT, especially in CO2a stands. The VT occurs in more exposed coastal areas of both New Brunswick and Prince Edward Island.

Successional Dynamics: CO2 is a mid to late successional VT dominated by white spruce. On relatively sheltered sites, this even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage and harvesting. CO4 (Balsam fir / Foxberry – Twinflower) may be an earlier successional stage on these sites. On the more exposed CO2a sites, gap or patch disturbance may be more typical because stunted white spruce are less prone to windthrow. CO2a does not tend to shift to other VTs, but does change in development stage. Between stand level disturbances, natural tree senescence can create uneven age class distribution and other stand structures.

Ecological Features

This closed canopy matrix forest is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. The forest's longevity is a function of either canopy tree senescence or the frequency of catastrophic stand disturbances (usually hurricanes). Stands close to the coast or on islands are used as nesting sites and roosts for great blue herons and various seabirds. Older stands with balsam fir may host the endangered boreal felt lichen and other uncommon cyanolichens. White spruce is the most salt tolerant and wind resistant of the native softwood species and acts as a protective belt for balsam fir. Krummholz (trees stunted by severe wind and salt spray exposure) is common at the coastline especially on headlands. Coastal forests are often used by songbirds as they travel along the coast during spring and fall migration.

Characteristic Plants	C02 Freq. (%)	C02 Cover (%)
White spruce	100	44.2
Balsam fir	100	15.7
Black spruce	83	4.2
White birch	50	4.0
Red maple	17	17.0
Choke cherry	17	0.1
Mountain-ash	17	0.1
Tree Layer (Mean % Cover)		**68**
Balsam fir	83	1.3
False holly	83	0.1
White birch	67	0.2
Lowbush blueberry	67	0.1
Velvet-leaf blueberry	50	0.4
Lambkill	50	0.1
Sweet gale	33	1.5
Mountain-ash	33	0.2
Common blackberry	33	0.1
Red raspberry	33	0.1
Wild red currant	33	0.1
Shrub Layer (Mean % Cover)		**15**
Bunchberry	83	12.4
Wild lily-of-the-valley	83	6.6
Starflower	83	1.2
Twinflower	67	12.3
Wood-sorrel	67	1.4
Foxberry	67	0.6
Cinnamon fern	67	0.1
Wood aster	67	0.1
Sarsaparilla	50	13.3
Goldthread	50	1.3
Bent-grass	50	0.1
Poverty grass	34	0.4
Black crowberry	33	7.5
Eastern spreading wood fern	33	1.5
Bracken	33	0.8
Evergreen wood fern	33	0.6
Creeping snowberry	33	0.1
Dwarf raspberry	33	0.1
Northern beech fern	33	0.1
Pink lady's slipper	33	0.1
White panicle aster	33	0.1
Herb Layer (Mean % Cover)		**35**
Schreber's moss	83	63.0
Stair-step moss	83	14.1
Bazzania	67	1.3
Broom moss	67	0.9
Pin cushion moss	50	0.1
Shaggy moss	33	2.8
Hypnum moss	33	0.6
Grey reindeer lichen	33	0.4
Plume moss	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**67**

Distinguishing Features

Abundant white spruce in the overstory is required to classify this coastal softwood forest. Mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, though they are not always present. The variant, C02a, is usually open grown and typical of headlands. Under open conditions black crowberry and common juniper grow in large patches.

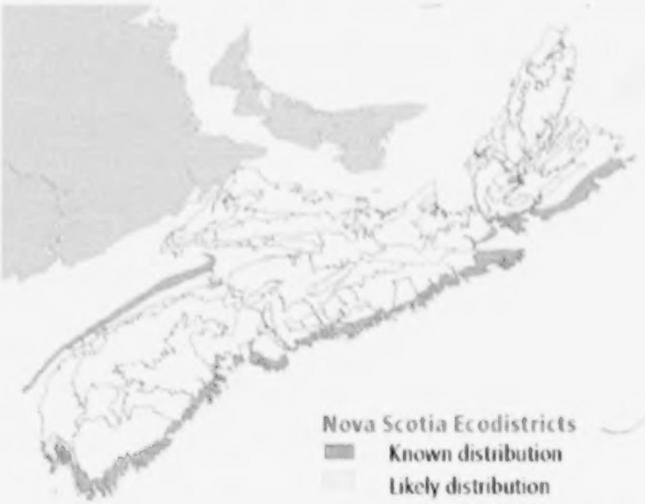
Headland

Site Characteristics

Slope Position: Middle^{5} Upper^{5}
Surface Stoniness: (Non - Slightly)^{7} (Moderately)^{3}
Bedrock Outcrop: (Non-rocky)^{8} (Slightly - Moderately)^{2}
Elevation Range: 18 - 58m
Slope Gradient: Gentle^{6} Moderate^{2} nd^{2}
Aspect: East^{5} West^{5}
Exposure: Exposed^{7} Mod. exposed^{3}
Microtopography: Slightly^{5} Level^{3} Moderately^{2}
Drainage: Moderately well^{5} Well^{5}

Soil Characteristics

Soil Type: ST2^{8} ST2-L^{1} ST8^{1}
Parent Material: Glacial till^{10}
Rooting Depth (cm): (<30)^{3} (30-45)^{7}
Duff Thickness (cm): (0-5)^{3} (6-10)^{5} (11-20)^{2}



Keyhole Brook,
Cape Chignecto,
Cumberland County

CO3

Red spruce / Mountain-ash / Foxberry

Picea rubens / Sorbus americana / Vaccinium vitis-idaea

n=10

Concept: This late successional Vegetation Type (VT) has an overstory dominated by red spruce with a component of balsam fir. CO3 is the only Maritime Boreal VT dominated by red spruce. Besides the presence of typical coastal forest species (e.g. mountain-ash and foxberry), CO3 differs from Acadian red spruce vegetation types by its relatively thick duff layer and extensive bazzania cover. The absence of hemlock, which is typically a component of Nova Scotia red spruce forests, is also a distinguishing feature of CO3. Red spruce / Mountain-ash / Foxberry is mainly found along the Bay of Fundy slopes.

Vegetation: Red spruce is the dominant overstory tree, with balsam fir and white birch as common associates. Yellow birch, black spruce, red maple and heart-leaf birch are also found in some stands. The poorly developed shrub layer is dominated by regenerating trees along with mountain-ash and velvet-leaf blueberry. The herb layer shows more development and includes typical upland flora such as twinflower, bunchberry, goldthread and sarsaparilla. Scattered foxberry can also be found, with cinnamon fern and three seeded sedge on wetter sites. Bazzania dominates the bryophyte layer.

Environmental Setting: CO3 is mainly associated with fresh to moist, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured. CO3 and earlier successional stages cover most of the well to imperfectly drained slopes along the Bay of Fundy. The best examples are found along Cape Chignecto where steep slopes limited the conversion of forest to agricultural land (as happened on the more gentle North Mountain slopes). This VT can also be found in the Tusket Islands ecodistrict. High winds and exposure limit tree height potential in CO3 stands. The VT occurs on the Fundy coast of New Brunswick.

Successional Dynamics: CO3 is a late successional VT dominated by red spruce. This VT typically follows stand-replacing disturbances such as windthrow, insect infestation and harvesting. The longevity and shade tolerance of red spruce provides an opportunity for the development of uneven-aged forests maintained by gap disturbances. CO4 (Balsam fir / Foxberry – Twinflower) can be a mid-successional stage. Forests that originate after harvesting may initially be dominated by pin cherry, raspberry, white birch, heart-leaf birch and mountain-ash.

Ecological Features

This closed canopy,large patch forest is primarily associated with the Fundy Shore ecoregion. The best provincial examples are along the slopes of Cape Chignecto, where steep topography limited forest conversion to agriculture. Along the more gentle Fundy slopes of the North Mountain, few stands have been spared from past and present farming. These forests feature some of the world's oldest red spruce, including the world record 445 year old found at Fundy National Park. Mature forests develop abundant old man's beard, a lichen used as nest material by warblers and other species, and a winter food for deer foraging on fallen trees. The rare arctic kidney lichen is found in some stands.

Characteristic Plants	C03 Freq. (%)	C03 Cover (%)
Red spruce	100	55.1
Balsam fir	90	14.5
White birch	50	7.2
Red maple	30	5.0
Heart-leaf birch	20	3.0
Yellow birch	10	16.0
Black spruce	10	13.0
White pine	10	10.0
Tree Layer (Mean % Cover)		**75**
Balsam fir	100	4.5
Red spruce	100	1.1
Velvet-leaf blueberry	70	0.3
Mountain-ash	70	0.1
Red maple	60	0.4
False holly	60	0.1
Heart-leaf birch	60	0.1
Lambkill	50	0.2
Yellow birch	40	0.8
Wild raisin	30	2.0
Fly honeysuckle	30	0.4
White birch	30	0.1
Huckleberry	20	0.9
White pine	20	0.1
Shrub Layer (Mean % Cover)		**7**
Bunchberry	100	5.2
Goldthread	100	2.5
Wild lily of the valley	70	0.4
Creeping snowberry	60	3.4
Twinflower	60	0.9
Painted trillium	60	0.1
Three seeded sedge	50	5.0
Foxberry	50	1.6
Sarsaparilla	50	1.0
Starflower	50	0.4
Clintonia	50	0.3
Pink lady's slipper	50	0.1
Cinnamon fern	40	10.1
Wood-sorrel	40	9.1
Eastern spreading wood fern	40	1.8
Wood aster	40	0.1
Bracken	30	1.3
Evergreen wood fern	20	0.4
Herb Layer (Mean % Cover)		**22**
Schreber's moss	100	14.8
Bazzania trilobata	90	49.8
Broom moss	80	1.8
Stair-step moss	70	2.1
Ladies' tresses	60	9.5
Common green sphagnum	50	6.6
Grey reindeer lichen	40	1.1
Ptilium ciliare	40	0.2
Hair-cap moss	40	0.1
Hypnum moss	30	1.7
Dicranum majus	20	0.8
Wavy dicranum	20	0.5
Bryo-Lichen Layer (Mean % Cover)		**73**

Distinguishing Features

Red spruce is diagnostic for this softwood forest found only along the Bay of Fundy and among the Tusket Islands. The presence of mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, although they are not always present.

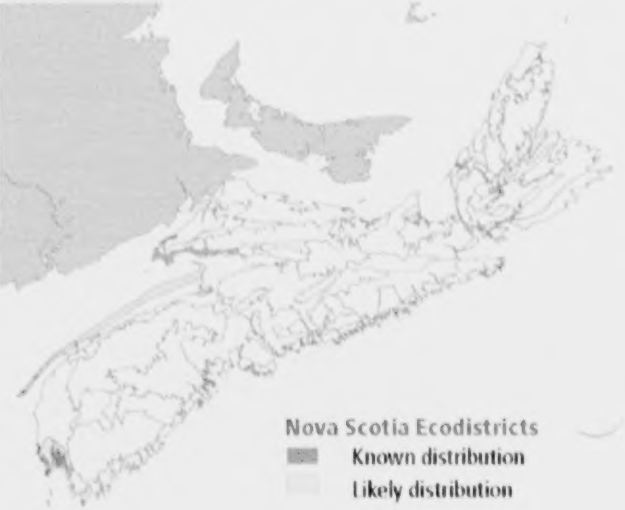
Bazzania

Site Characteristics

Slope Position: Upper^{4} Middle^{3} Lower^{2} Level^{1}
Surface Stoniness: (Non - Slightly)^{10}
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 27 - 66m
Slope Gradient: Gentle^{8} Level^{1} nd^{1}
Aspect: North^{2} East^{2} West^{5} None^{1}
Exposure: Exposed^{6} Mod. Exposed^{3} Moderate^{1}
Microtopography: Moderately^{4} Slightly^{4} Level^{1} Strongly^{1}
Drainage: Imperfect^{5} Well^{3} Moderately well^{1} Poor^{1}

Soil Characteristics

Soil Type: ST3^{4} ST2^{3} ST2-L^{1} ST3-L^{1} ST4^{1}
Parent Material: Glacial till^{10}
Rooting Depth (cm): (<30)^{7} (30-45)^{8}
Duff Thickness (cm): (11-20)^{9} (21-40)^{1}



Halfway Island Cove, Guysborough County

CO4

Balsam fir / Foxberry – Twinflower

Abies balsamea /Vaccinium vitis-idaea – Linnaea borealis

n=9

Concept: This mid to late successional Vegetation Type (VT) has an overstory dominated by balsam fir. Balsam fir regeneration and moss cover are usually extensive. Balsam fir / Foxberry – Twinflower represents the dominant forest found on fresh/moist, nutrient medium sites along the Atlantic coast of Nova Scotia.

Vegetation: Balsam fir is the dominant overstory tree along with lesser amounts of black spruce and white spruce. Tamarack can also be common on moister sites. Scattered red maple and white birch (if present) are typically in an intermediate canopy position. The shrub layer is dominated by regenerating balsam fir with scattered lambkill, false holly and mountain-ash. Herb layer diversity is low, with frequent bunchberry, wild lily-of-the-valley, sarsaparilla, twinflower and foxberry. Schreber's moss and bazzania dominate the extensive bryophyte layer, along with stair-step moss, broom moss and plume moss.

Environmental Setting: CO4 is mainly associated with fresh to fresh-moist, nutrient poor to medium soils of glacial origin. These soils are generally medium to coarse textured and often stony. The majority of this VT is found in the Atlantic Coastal ecoregion. High winds and exposure limit tree height potential in CO4 stands. The VT likely occurs in more exposed coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

Successional Dynamics: CO4 is a mid to late successional VT dominated by balsam fir. This even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. In the absence of disturbance, the typical lifespan of balsam fir in this ecosystem is 100 years, after which tree senescence will initiate renewal through advanced regeneration. Depending in part on the level of advanced regeneration at time of disturbance, CO4 can perpetuate itself or possibly transition into CO1 (Black spruce – Balsam fir / Foxberry / Plume moss), CO2 (White spruce – Balsam fir / Foxberry – Twinflower) or CO3 (Red spruce / Mountain-ash /Foxberry). Succession to CO1 would be on poorer sites while movement to CO3 would only occur in geographic areas supporting this VT. CO4 may also transition to CO5 (White birch – Balsam fir / Foxberry – Wood aster) on more sheltered sites. Forests that originate after harvesting may initially be dominated by pin cherry, raspberry, white birch and mountain-ash.

Ecological Features

This closed canopy matrix forest is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. The forest's longevity is a function of either canopy tree senescence or the frequency of catastrophic stand disturbances (usually hurricanes). Both create abundant snags, coarse woody debris, and dense regenerating fir thickets – good cover for small mammals. Stands close to the coast or on islands are used as nesting sites and roosts for great blue herons and some seabirds. Coastal forests are often used by songbirds as they travel along the coast during spring and fall migration. Older stands with balsam fir may have the endangered boreal felt lichen and other uncommon cyanolichens. Mature forests develop abundant old man's beard, a lichen used for nest material by warblers and other species, and winter food for deer foraging on fallen trees.

Characteristic Plants

	C04	
	Freq. (%)	Cover (%)
Balsam fir	100	50.2
Black spruce	78	7.1
White spruce	67	10.8
White birch	44	1.3
Red maple	33	1.7
Tamarack	22	17.3
Grey birch	11	1.0
Red oak	11	1.0
Tree Layer (Mean % Cover)		**68**
Balsam fir	89	20.7
Lambkill	78	0.5
False holly	78	0.1
White birch	67	0.2
Mountain ash	56	0.7
Lowbush blueberry	44	1.6
Wild raisin	44	0.9
Black spruce	33	1.7
Serviceberry	33	0.4
White spruce	22	2.0
Downy alder	22	0.2
Shrub Layer (Mean % Cover)		**23**
Twinflower	78	10.5
Bunchberry	78	1.6
Wild lily of the valley	78	0.8
Foxberry	78	0.3
Sarsaparilla	67	4.2
Starflower	67	0.3
Creeping snowberry	44	7.6
Bluebead lily	44	2.4
Cinnamon fern	44	1.5
Wood-sorrel	44	1.4
Goldthread	44	0.5
Bracken	33	0.1
Evergreen wood fern	33	0.1
Indian pipe	33	0.1
Wood aster	33	0.1
Herb Layer (Mean % Cover)		**20**
Schreber's moss	100	35.9
Stair-step moss	89	13.4
Broom moss	89	2.8
Bazzania	78	23.7
Plume moss	56	3.7
Hair-cap moss	44	10.5
Wavy dicranum	44	1.5
Hypnum moss	22	1.3
Ladies' tresses	22	0.5
Cup lichens	22	0.3
Pale fat-leaved sphagnum	22	0.1
Grey reindeer lichen	22	0.1
Bryo-Lichen Layer (Mean % Cover)		**78**

Distinguishing Features

Balsam fir is the dominant species in this coastal softwood forest. The presence of mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, though they are not always present. Extensive moss coverage and a thick duff layer characterize the forest floor.

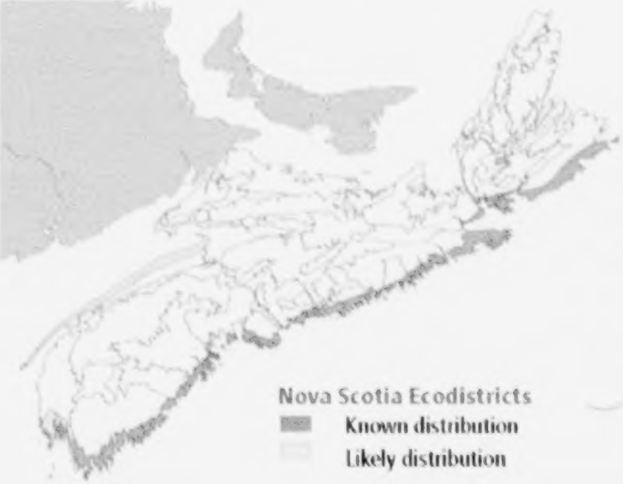
Twinflower

Site Characteristics

Slope Position:	Upper^5 Level^2 Middle^2 nd^1
Surface Stoniness:	(Non - Slightly)^4 (Moderately)^3 (Very - Excessively)^2 nd^1
Bedrock Outcrop:	(Non rocky)^9 (Slightly - Moderately)^1
Elevation Range:	5 - 41m
Slope Gradient:	Gentle^7 Level^1 Moderate^1 Steep^1
Aspect:	North^3 East^2 South^3 West^1 None^1
Exposure:	Exposed^8 Mod. exposed^2
Microtopography:	Slightly^4 Level^2 Moderately^2 Strongly^2
Drainage:	Moderately well^6 Well^3 Imperfect^1

Soil Characteristics

Soil Type:	ST2^7 ST3^1 ST15^1 nd^1
Parent Material:	Glacial till^9 Till/Bedrock^1
Rooting Depth (cm):	(<30)^2 (30-45)^7 nd^1
Duff Thickness (cm):	(11-20)^9 nd^1



Nova Scotia Ecodistricts

▨ Known distribution

▢ Likely distribution

Waddens Cove,
Cape Breton County

CO5

White birch – Balsam fir / Foxberry – Wood aster

Betula papyrifera – Abies balsamea / Vaccinium vitis-idaea – Aster acuminatus

n=2

Concept: This mid-successional Vegetation Type (VT) has an overstory dominated by white birch, usually with a strong component of balsam fir. In western Nova Scotia, trembling aspen, red maple and white spruce can also be common in the overstory. Extensive conifer regeneration often dominates the shrub layer. White birch – Balsam fir / Foxberry – Wood aster is usually associated with more sheltered sites across the Atlantic Coastal ecoregion.

Vegetation: White birch is the dominant overstory tree, along with balsam fir and/or white spruce. Scattered red maple and black spruce are also typical and minor amounts of heart-leaf birch — a species usually confined to Nova Scotia's coastal and highland ecoregions — is sometimes in the overstory. The shrub layer is often dominated by regenerating balsam fir. Other shrubs include wild raisin, velvet-leaf blueberry, lambkill, false holly and mountain-ash (which can sometimes attain overstory height and crown breadth). Herb layer diversity is low; only bunchberry, goldthread, creeping snowberry and foxberry are common. The bryophyte layer is well developed for a mixedwood VT, with Schreber's moss the main species. Bazzania cover can also be high where coarse woody debris has accumulated on the forest floor.

Environmental Setting: CO5 is associated with fresh to moist, nutrient medium to rich soils of glacial origin. These soils are generally medium to coarse textured. This VT occurs on relatively well drained upper and middle slopes of gentle terrain along the Atlantic coastline. Sites are generally more sheltered than those associated with softwood dominated VTs in this group (CO1 – CO4). The VT likely occurs in coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

Successional Dynamics: CO5 is a mid-successional VT dominated by white birch and balsam fir and/or white spruce. This even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. Although still influenced by wind and exposure, like other coastal VTs, increased shelter allows hardwood tree species to rise above or co-dominate the canopy with softwoods on CO5 sites. Depending on the disturbance agent and its return interval, and on the degree of sheltering, CO5 may succeed to CO6 (Red maple – White birch / Bunchberry – Sarsaparilla) or transition to CO4 (Balsam fir / Foxberry – Twinflower).

Ecological Features

This mixedwood patch forest of white birch, red maple and balsam fir is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. It is usually found inland, protected by seaward stands of spruce and fir forest or on sites sheltered from coastal winds and salt spray. The short longevity and shade intolerance of white birch, relative to red maple,can produce uneven-aged canopy structures. Older stands with balsam fir may have the endangered boreal felt lichen and other uncommon cyanolichens.

Characteristic Plants	C05	
	Freq. (%)	Cover (%)
White birch	100	41.5
Black spruce	100	4.5
Red maple	100	2.5
Balsam fir	50	30.0
White spruce	50	20.0
Tree Layer (Mean % Cover)		**74**
Velvet-leaf blueberry	100	3.8
Lambkill	100	3.3
Wild raisin	100	2.1
Black spruce	100	0.8
White birch	100	0.2
False holly	100	0.1
Balsam fir	50	15.0
White spruce	50	1.5
Bush-honeysuckle	50	0.8
Red maple	50	0.4
Red-berried elder	50	0.3
Mountain-ash	50	0.1
Serviceberry	50	0.1
Shrub Layer (Mean % Cover)		**20**
Bunchberry	100	9.5
Goldthread	100	3.3
Creeping snowberry	100	1.8
Foxberry	100	0.6
Starflower	100	0.6
Wild lily-of-the-valley	100	0.6
Twinflower	100	0.5
Wood aster	100	0.1
Bracken	50	1.0
Evergreen wood fern	50	0.5
Bluebead lily	50	0.1
Mayflower	50	0.1
Spinulose wood fern	50	0.1
Herb Layer (Mean % Cover)		**18**
Schreber's moss	100	49.5
Broom moss	100	4.5
Hair-cap moss	100	2.0
Cup lichens	100	0.6
Bazzania	50	8.0
Stair-step moss	50	7.0
Grey reindeer lichen	50	3.0
Hypnum moss	50	0.5
Bryo-Lichen Layer (Mean % Cover)		**66**

Distinguishing Features

White birch and balsam fir are common in the overstory of this coastal mixedwood forest. The presence of mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence though not always present. Wood aster is common. Moss coverage on the forest floor is still extensive even with the hardwood overstory.

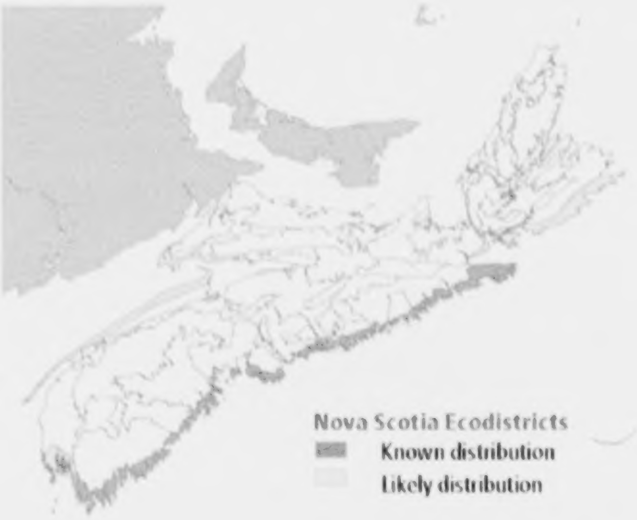
Foxberry
[Brough Quigley]

Site Characteristics

Slope Position: Middle^5 Upper^5
Surface Stoniness: (Very - Excessively)^{10}
Bedrock Outcrop: (Non-rocky)^5
(Slightly - Moderately)^5
Elevation Range: 17 - 24m
Slope Gradient: Gentle^5 Moderate^5
Aspect: West^{10}
Exposure: Exposed^5 Mod. exposed^5
Microtopography: Level^5 Slightly^5
Drainage: Well^{10}

Soil Characteristics

Soil Type: ST2^5 ST2-L^5
Parent Material: Glacial till^5 Till/Bedrock^5
Rooting Depth (cm): (30-45)^{10}
Duff Thickness (cm): (0-5)^{10}



Nova Scotia Ecodistricts
▨ Known distribution
▢ Likely distribution

*Blanche,
Shelburne County*

CO6

Red maple – Birch / Bunchberry – Sarsaparilla

Acer rubrum – Betula spp. / Cornus canadensis – Aralia nudicaulis

n=6

Concept: This late successional Vegetation Type (VT) has an overstory dominated by red maple and/or white birch. Extensive conifer regeneration often dominates the shrub layer. Red maple – White birch / Bunchberry – Sarsaparilla is usually associated with more sheltered sites within the Atlantic Coastal ecoregion.

Vegetation: Red maple and white birch are the dominant overstory trees with balsam fir as a common associate. Heart leaf birch (a species confined to the Coastal and Highland ecoregions) and yellow birch are sometimes found scattered in the overstory, while red oak, white pine and white spruce may also be present in western Nova Scotia. The shrub layer is often dominated by regenerating balsam fir. Other shrubs may include wild raisin, huckleberry, lambkill and mountain ash (which can sometimes attain overstory height). Herb layer diversity is low, and bunchberry, goldthread, sarsaparilla, wood sorrel and bracken are common. The bryophyte layer is relatively well developed for a hardwood VT, dominated by Schreber's and hypnum mosses. Bazzania can also be found where coarse woody debris has accumulated on the forest floor.

Environmental Setting: CO6 is associated with fresh to moist, nutrient medium to rich soils of glacial origin. These soils are generally medium to coarse textured. This VT occurs on relatively well drained upper and middle slopes of gentle terrain along the Atlantic coastline. Sites are generally more sheltered than those associated with softwood dominated VTs in this group (CO1 – CO4). CO6 likely occurs in coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

Successional Dynamics: CO6 is a late successional VT dominated by red maple and white birch. This even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. Although still influenced by wind and exposure, like other coastal VTs, increased shelter allows hardwood tree species to rise above softwoods on CO6 sites. However, softwoods (particularly balsam fir) will often dominate disturbed areas until hardwoods become re-established. CO5 (White birch – Balsam fir / Foxberry – Wood aster) is a mid-successional stage.

Ecological Features

This small patch white birch and red maple forest is principally associated with the Maritime Boreal Atlantic Coastal ecoregion. It is usually found further inland, protected by seaward stands of spruce and fir forest or on sites sheltered from coastal winds and salt spray. Young red maple shoots are a food source favoured by deer. The canopy of red maples and white birch provide excellent nesting cover for many species of birds. Seeds of both species are eaten by a variety of small mammals that find cover in tree cavities and woody debris. Wild raisin, huckleberry, blueberry and mountain ash provide important seasonal berry crops.

Characteristic Plants

	C06	
	Freq. (%)	Cover (%)
Red maple	67	40.8
White birch	50	29.0
Balsam fir	33	13.0
Yellow birch	33	3.5
Heart-leaf birch	17	18.0
Black spruce	17	5.0
Tree Layer (Mean % Cover)		**51**
Balsam fir	83	8.6
Wild raisin	67	5.5
Lambkill	67	4.8
Velvet-leaf blueberry	67	1.5
Huckleberry	50	29.7
Mountain-ash	50	0.2
White birch	50	0.1
Black spruce	33	2.3
False holly	33	1.6
Red maple	33	1.0
Yellow birch	33	0.3
White spruce	33	0.2
Common blackberry	33	0.1
Shrub Layer (Mean % Cover)		**35**
Bunchberry	83	17.2
Goldthread	83	3.8
Sarsaparilla	67	4.6
Bracken	67	3.3
Starflower	67	0.1
Cinnamon fern	50	1.0
Evergreen wood fern	50	0.3
Wood-sorrel	33	40.3
Trailing blackberry	33	2.5
Eastern spreading wood fern	33	1.9
Wild lily-of-the-valley	33	1.0
Brownish sedge	33	0.5
Drooping wood sedge	33	0.1
Fibrous-root sedge	33	0.1
Pink lady's slipper	33	0.1
Spinulose wood fern	33	0.1
Wood aster	33	0.1
Herb Layer (Mean % Cover)		**40**
Schreber's moss	67	5.5
Hypnum moss	50	6.0
Broom moss	50	0.7
Bazzania	33	1.4
Bryo-Lichen Layer (Mean % Cover)		**12**

Distinguishing Features

Red maple and white birch are common in the overstory of this coastal mixedwood forest. Though not always present, mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence. Moss coverage on the forest floor is still extensive even with the hardwood overstory.

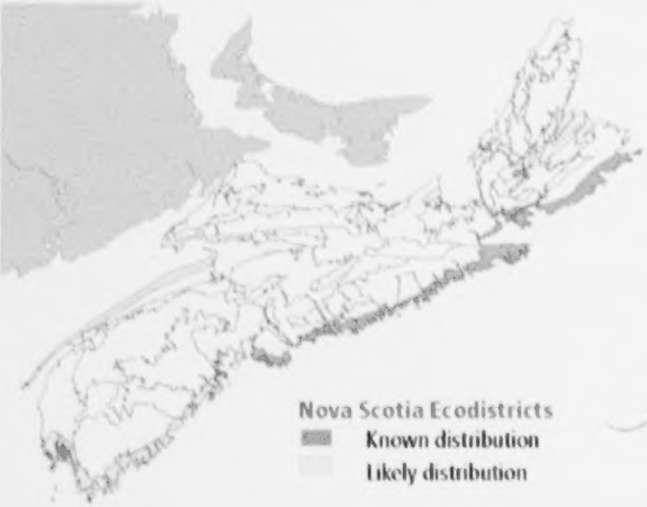
Mountain-ash

Site Characteristics

Slope Position:	Middle^{3} Upper^{1} Level^{2}
Surface Stoniness:	(Very - Excessively)^{3} (Moderately)^{1} (Non - Slightly)^{2}
Bedrock Outcrop:	(Non-rocky)^{4} (Slightly - Moderately)^{2}
Elevation Range:	33 - 121m
Slope Gradient:	Moderate^{3} Gentle^{1} Level^{2}
Aspect:	North^{1} East^{2} South^{1} West^{1} None^{1}
Exposure:	Exposed^{4} Mod. exposed^{2}
Microtopography:	Slightly^{3} Moderately^{1} Strongly^{2}
Drainage:	Moderately well^{3} Imperfect^{1} Well^{2}

Soil Characteristics

Soil Type:	ST2-L^{3} ST3^{2} nd^{1}
Parent Material:	Glacial till^{4} Colluvium^{2}
Rooting Depth (cm):	(<30)^{2} (30-45)^{3} (>45)^{1} nd^{2}
Duff Thickness (cm):	(6-10)^{3} (11-20)^{2} nd^{1}



Nova Scotia Ecodistricts

▨	Known distribution
☐	Likely distribution

Carters Beach,
Queens County

CO7

White spruce / Bayberry

Picea glauca / Myrica pensylvanica

n=3

Concept: This white spruce dominated woodland is found on coastal sand dunes, where it marks the last stage of dune vegetation succession. Crown closure is variable but usually moderate. Woody species contribute largely to understory stand structure, except in mature occurrences where increased bryophyte cover is typical. Stands with high lichen cover have been observed but have not been surveyed and are not currently recognized in this classification. Under denser canopy growth, understory vegetation is usually sparse and discontinuous.

Vegetation: The evergreen canopy supports high white spruce cover, and occasionally includes minor to moderate levels of white pine, black spruce and/or balsam fir. Stands have either open or closed canopies, depending on their age and degree of exposure. More open stands are characterized by increased shrub (usually bayberry) cover and scattered herbaceous plants like baltic rush and beach grass. Terric (ground dwelling) lichen cover is not characteristic except on the edges of open areas more heavily dominated by reindeer lichen species.

Environmental Setting: Dune forest is found at low elevation on flat and hummocky terrain. It occurs on both wind and marine deposited sands. These relatively young deposits show little mineral soil development, but evidence of leaching (thin Ae and Bfj horizons) can be found in some profiles. In addition, mature CO7 stands often have continuous forest floor and moss cover. Moist dune forests have not been sampled, but may be possible on longer dunes in lower slope positions. Exposure is high; exposed stones and bedrock are very low. CO7 occurs in eastern New Brunswick and on the north shore of Prince Edward Island.

Successional Dynamics: Successional dynamics of dune forest in Nova Scotia are poorly understood. This ecosystem is considered the final stage of succession on aeolian and marine landforms, but little discussion or investigation of its longer-term persistence is documented. Increased litter and humus under these older closed canopy dune forests may increase available moisture and promote species that are more characteristic of mesic coastal forests. If this scenario is valid, dune evergreen forests may advance to coastal white spruce (CO1) or coastal black spruce forest (CO2), depending on soil structure, nutrient and moisture availability, and topographic position.

Ecological Features

Vertical and horizontal structure in the White Spruce/ Bayberry ecosystem is variable, but most occurrences have an open canopy and high shrub and/ or herbaceous cover. On more extensive dune complexes, CO7 stands sometime provide the only available forest cover. CO7's occurrence at shorelines may make it important coastal bird habitat (e.g. for fox and sharp-tailed sparrows; yellow-rumped and blackpoll warblers), epiphytic and ground lichens, and various invertebrates, among other taxonomic groups. Records from available plot data show very few plant species (e.g. adders-tongue, checkered rattlesnake plantain) and no lichen species of conservation concern. Many dune woodlands in Nova Scotia have been impacted by recreational activities and past land-use practices (e.g. anthropogenic fire, tree harvest and farming). These impacts, and the relative rarity of CO7, present important conservation challenges.

Characteristic Plants

	C07 Freq. (%)	C07 Cover (%)
White spruce	100	31.7
Trembling aspen	33	6.0
White pine	33	5.0
Red maple	33	3.0
Tree Layer (Mean % Cover)		**36.3**
Bayberry	67	10.0
Wild rose	67	7.5
Serviceberries	67	1.0
Red maple	67	0.1
Red oak	67	0.1
White spruce	33	10.0
Western poison ivy	33	2.0
Choke cherry	33	1.0
Pin cherry	33	1.0
Gooseberry family	33	0.1
Red raspberry	33	0.1
Shrub Layer (Mean % Cover)		**17.2**
Sarsaparilla	33	40.0
Dwarf raspberry	33	3.0
Field horsetail	33	3.0
Mouse eared hawkweed	33	3.0
Canada bluegrass	33	2.0
Tall white aster	33	2.0
Baltic rush	33	1.0
Red fescue	33	1.0
Rough goldenrod	33	1.0
Spinulose wood fern	33	1.0
Bladder sedge	33	0.5
Beach grass	33	0.1
Bunchberry	33	0.1
Coltsfoot	33	0.1
Creeping bent grass	33	0.1
Evening primrose	33	0.1
Millet grass	33	0.1
New York aster	33	0.1
Sheep-sorrel	33	0.1
Small enchanter's nightshade	33	0.1
Strawberry	33	0.1
Sweet-scented bedstraw	33	0.1
Wild carrot	33	0.1
Woodland horsetail	33	0.1
Yarrow	33	0.1
Herb Layer (Mean % Cover)		**19.7**
Wavy dicranum	67	0.5
Schreber's moss	33	15.0
Broom moss	33	2.0
Plume moss	33	0.5
Stair-step moss	33	0.5
Atrichum moss	33	0.1
Bazzania	33	0.1
Pin cushion moss	33	0.1
Shaggy moss	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**6.5**

Distinguishing Features

This coastal softwood woodland of white spruce is found on dunes and marine sands. Under very open conditions beach grass and other seashore plants are expected.

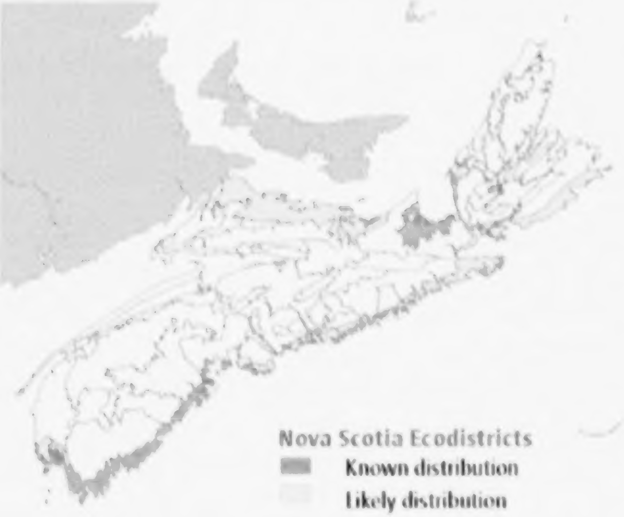
Bayberry

Site Characteristics

Slope Position:	Level^{2} Upper^{1}
Surface Stoniness:	(Non - Slightly)^{3}
Bedrock Outcrop:	(Non rocky)^{3}
Elevation Range:	2 - 25m
Slope Gradient:	Level^{2} nd^{1}
Aspect:	East^{1} None^{2}
Exposure:	Exposed^{2} Mod. exposed^{1}
Microtopography:	Level^{3}
Drainage:	Rapid^{2} Well^{1}

Soil Characteristics

Soil Type:	ST1^{3}
Parent Material:	Aeolian^{3}
Rooting Depth (cm):	(>45)^{2} nd^{1}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{1} nd^{1}



FP Flood Plain Forest Group

(n = 77)

FP1	Sugar maple – White ash / Ostrich fern – Wood goldenrod
FP2	Red maple – Red oak / Bellwort – Nodding trillium . . . . . . **FP2a** Sugar maple variant
FP3	Red maple / Sensitive fern – Rough goldenrod
FP4	Balsam poplar – White spruce / Ostrich fern – Cow-parsnip
FP5	Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit
FP6	White spruce / Wood goldenrod / Shaggy moss

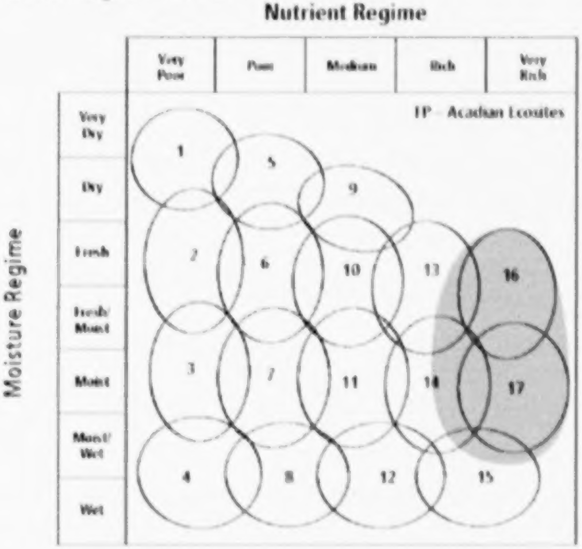
Concept: These are forests associated with active floodplains annually or periodically flooded and enriched by sediment. Vegetation Types (VT) are mainly mixed hardwood forests, often with scattered white spruce. The understory is characterized by a species-rich herb layer and a poorly developed or non-existent bryophyte layer. All VTs in this group are found in the Acadian Ecosite group.

Vegetation: Vegetation types are mainly closed canopy forests of hardwood including sugar maple, red maple, red oak, white ash, balsam poplar and black cherry. A softwood VT dominated by white spruce occurs on less active floodplains and adjacent terraces. Beaked hazel, chokecherry, wild raisin, ironwood and regenerating tree species are common in the shrub layer. A rich, diverse herb layer usually has meadow rue, several fern species (including ostrich fern), several sedge species, nodding trillium, wood goldenrod and asters. Except for white spruce dominated sites, bryophyte/lichen cover is usually low or non-existent.

Environmental Setting: Vegetation types in this group are found on active floodplain sites and occasionally on infrequently flooded terraces and low riparian slopes. Seasonally active channels and small depressions are common providing sites for additional plant diversity. Soils are usually fresh to fresh-moist (but sometimes wetter) and rich to very rich. These alluvium deposits are usually deep, of variable texture and stone free (although gravel layers are often encountered). Earthworms are common in these soils and if an organic layer is present it is usually very thin. This group is prominent in the Northumberland Bras d'Or Lowlands (500) and Valley and Central Lowlands (600) ecoregions, as well as the Inverness Lowlands (320) ecodistrict. It can also be found along some rivers in the Eastern (400) and Western (700) ecoregions.

Successional Dynamics: Successional dynamics in this group are not well understood due to a long history of settlement and agricultural activities on these very productive sites. An early pioneer association of willows, cherries, serviceberries and alders may establish on newly created or heavily disturbed sites. Several successional stages are described, leading to a unique climax forest comprised of shade tolerant hardwoods including sugar maple, red maple and white ash. Elm was once a significant part of this forest, but has been almost wiped out in natural habitats by Dutch elm disease. Older forests of red maple and red oak are also known. Flooding, channelization, ice scour, insects and disease are potential disturbance agents.

Edatopic Grid



Ecological Features

Flooded forests have the highest landform, structural and species diversity of any forest group in Nova Scotia. This inherent complexity originates with regular flooding events and the associated deposition and erosion of stream sediment. Flood cycles also recharge nutrient and water reserves, producing extremely rich soils and inherently dynamic and productive forests. Ecosystems in this group feature numerous microhabitats including seasonally active channels, vernal pools, levees and ox-bow ponds. Many wildlife species spend all or parts of their lives in these riparian forests. Those with the highest affinities include several rare plants, birds (e.g. grey catbird, yellow warbler, ovenbird, northern waterthrush, mourning warbler, common yellowthroat, Wilson's warbler and northern oriole), amphibians (e.g. wood frog), reptiles (e.g. wood turtle), mammals (e.g. mink, otter, muskrat and several bat species) and invertebrates. Old growth forests composed of very large, tall trees will develop on the less active floodplains with strong sugar and red maple composition. Patch size is variable and most stands have been strongly truncated by past land use.

Brickton, Annapolis County

FP1

Sugar maple – White ash / Ostrich fern – Wood goldenrod

Acer saccharum – Fraxinus americana / Matteuccia struthiopteris – Solidago flexicaulis

n=29

Concept: This late successional forest is characterized by a well-developed canopy of sugar maple and/or white ash. Herbaceous plants usually dominate the species-rich understory, but shrub development can be moderate to high in younger or disturbed stands. The low elevation deciduous forest is the last stage of successional development on most large, well drained floodplains. The majority of stands have been reduced in size by past land-use activities and/or natural river disturbances.

Vegetation: The overstory may feature one or more layers, depending on the age structure and successional history of the stand. Although many occurrences of FP1 originate with floodplain formation, the inherently dynamic nature of riparian forests often results in pockets of either younger or older trees embedded within the main canopy. This closed canopy ecosystem has well developed layers of sugar maple and/or white ash. Other trees species (e.g. ironwood, white spruce, elm, yellow birch, black cherry) may be found in small clumps or sparsely scattered throughout. Elm is also occasionally found, but rarely in a mature age class because of Dutch elm disease. The species-rich understory is typically dominated by a very well-developed herbaceous layer of ostrich fern, sensitive fern, meadow-rue and numerous other species including several rare vascular plants. Shrub cover is variable but usually reduced, except in younger or disturbed stands. This ecosystem supports very low ground lichen and bryophyte cover.

Environmental Setting: FP1 is mainly associated with fresh to fresh-moist, nutrient very rich alluvium soils. This Vegetation Type (VT) is most often found along rivers in central and northern Nova Scotia, but can also be found in parts of western Nova Scotia and Cape Breton. Most occurrences are on level or gently sloping floodplains. Soils are usually deep medium textured and have low coarse fragment content and minimal humus development. Annual or biannual flood cycles are typical. This VT occurs across southeastern New Brunswick but has been extirpated from Prince Edward Island.

Successional Dynamics: This stable mature forest is the last stage of successional development on rich, actively flooded and well drained riparian soils. It can develop from several early to mid-successional VTs including FP3 (Red maple / Sensitive fern – Rough goldenrod), FP4 (Balsam poplar – White spruce / Ostrich fern – Cow parsnip) or FP5 (Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit). On especially rich river deposits, white ash may play a larger role in stand history, acting as a pioneer before sugar maple advances to co-dominate the canopy. Disturbance agents include flood events, ice scour, insects and disease, and various human activities including farming, cottage and trail development and tree harvest.

Ecological Features

This linear ecosystem can be as narrow as a few meters or exceed one hundred meters in width. Most stands have been reduced in size by past land-use activities, but some less disturbed occurrences are also small by nature. It features a closed canopy and a diverse mosaic of microhabitat features. Plant species richness is the highest of any provincial forest ecosystem, and may include numerous rare plants (e.g. Canada lily, blue cohosh, wild leek, thimbleweed, Canada wood-nettle, hairy sedge, blunt-leaved bedstraw, anise-root and Wiegand's wild rye). Riparian forests may provide important nesting or foraging habitat for amphibian, dragonflies, damselflies and vertebrate species. Many bird species are associated with the forest-shoreline interface. Healthy tracts of riparian forests help buffer riparian disturbances such as flooding and ice scour; they regulate water flow and reduce erosion, provide organic matter and nutrients, and contribute to riparian connectivity. Old growth forests of impressive stature may develop.

Characteristic Plants	FP1	
	Freq. (%)	Cover (%)
Sugar maple	89	37.7
White ash	82	35.2
Ironwood	57	8.3
White spruce	50	6.7
Yellow birch	36	16.5
Elm	21	5.0
White birch	21	5.0
Black cherry	18	3.0
Red maple	14	12.0
Balsam fir	14	7.8
Hemlock	14	5.0
Red oak	11	5.3
Balsam poplar	11	5.0
Tree Layer (Mean % Cover)		**85**
White ash	86	5.0
Sugar maple	82	16.9
Choke cherry	46	14.3
Beaked hazelnut	43	1.0
Ironwood	39	3.3
White spruce	39	3.2
Balsam fir	36	6.9
Alternate-leaved dogwood	36	0.5
Striped maple	29	2.3
Shrub Layer (Mean % Cover)		**39**
Meadow rue	82	0.5
Ostrich fern	79	22.7
Sensitive fern	75	10.0
Wood goldenrod	64	0.4
Nodding trillium	54	0.6
Jewelweed	43	1.6
Bladder sedge	43	0.8
Jack-in-the-pulpit	43	0.8
Lady fern	39	2.2
Drooping wood sedge	39	0.6
Small enchanter's nightshade	39	0.4
Evergreen wood fern	36	7.4
Oak fern	36	2.7
Violets	36	2.2
Tall buttercup	36	1.1
Christmas fern	36	0.5
Wild lily-of-the-valley	36	0.3
Dandelion	36	0.1
Northern beech fern	32	3.0
Dwarf raspberry	32	2.9
Graceful sedge	32	0.8
Starflower	32	0.1
Large enchanter's nightshade	29	2.6
Rough goldenrod	29	1.8
Herb-Robert	29	0.5
Rose twisted stalk	29	0.4
Common speedwell	29	0.3
Tall white aster	29	0.3
Bloodroot	25	12.5
Brome-like sedge	25	1.7
Cow-parsnip	25	1.4
Long-stalked sedge	25	1.3
Herb Layer (Mean % Cover)		**51**
Shaggy moss	32	2.5
Bryo-Lichen Layer (Mean % Cover)		**1**

Distinguishing Features

Evidence of annual flooding should be apparent. Seasonally active channels are common. Herbs are usually extensive and ground lichens and mosses scarce if present at all. Ostrich fern, meadow rue, Jack-in-the-pulpit and nodding trillium are typical floodplain species. Ironwood is usually present.

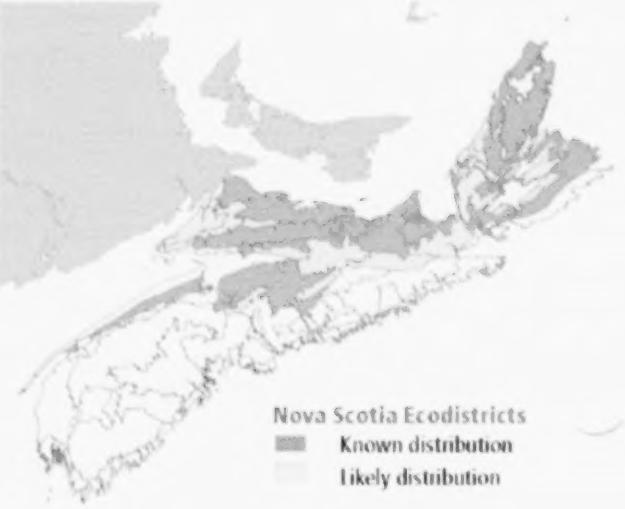
Bloodroot

Site Characteristics

Slope Position:	Level^{9} Other^{1}
Surface Stoniness:	(Non - Slightly)^{9} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	7 - 149m
Slope Gradient:	Level^{10}
Aspect:	None^{10}
Exposure:	Mod. sheltered^{4} Sheltered^{4} Moderate^{1} nd^{1}
Microtopography:	Level^{7} Slightly^{2} Moderately^{1}
Drainage:	Well^{5} Moderately well^{2} Rapid^{2} Other^{1}

Soil Characteristics

Soil Type:	ST8^{6} ST8-C^{2} ST9^{1} nd^{1}
Parent Material:	Alluvium^{10}
Rooting Depth (cm):	(30-45)^{1} (>45)^{8} nd^{1}
Duff Thickness (cm):	(0-5)^{8} (6-10)^{1} nd^{1}



Greenwood,
Kings County

FP2

Red maple – Red oak / Bellwort – Nodding trillium

Acer rubrum – Quercus rubra / Uvularia sessilifolia – Trillium cernuum

FP2a

Sugar maple variant

Acer saccharum

n=9

Concept: The Red maple – Red oak / Bellwort – Nodding trillium forest is characterized by high levels of red oak and maple in the canopy. It is distinguished from other floodplain forests based on its restricted geographic distribution, reduced fern cover, and prominent representation of species like red oak, bellwort and black cherry. The sugar maple variant (FP2a) describes stands with prominent levels of sugar maple in the canopy.

Vegetation: This closed canopy forest features red oak with prominent levels of either red maple or sugar maple. Most occurrences of FP2 support red maple, but somewhat richer and/or older stands feature low to moderate levels of sugar maple. Ironwood is a frequent but minor component of the lower canopy. Other tree species (e.g. black cherry, elm, white spruce, white ash) may be present, but are less common. The understory is open and often sparse, except in young or disturbed stands where shrub cover is promoted. Herbaceous cover is low to moderate depending on available moisture. Bryophyte prominence is reduced. This ecosystem features common floodplain species like nodding trillium, late goldenrod, graceful sedge and brome-like sedge.

Environmental Setting: FP2 is mainly associated with fresh to fresh-moist, nutrient rich to very rich alluvium soils. Most occurrences are on flat or gently sloping floodplains. FP2 sites are often broken up by seasonally active channels and small depressions. Soils are very deep and largely free of coarse fragments. This Vegetation Type (VT) is mainly found in the western ecoregion (along the Annapolis River and major tributaries), but may occur in other warm ecoregions with sandy riparian soils. Annual or biannual flood cycles are typical. Known Canadian occurrences of this mid to late successional forest are limited to Nova Scotia, but the ecosystem may occur in parts of southern New Brunswick.

Successional Dynamics: This ecosystem can be expressed at a variety of successional stages. Typical stands are relatively stable but expected to transition to a later successional stage defined by the sugar maple variant (FP2a). Successional history is otherwise not fully understood. Most known occurrences have been heavily impacted by past land use activity, including cultivation, land clearing and tree harvest. Other disturbance agents include flooding, ice scour, insects and disease.

Ecological Features

This linear ecosystem occurs in unconnected patches along riparian corridors. It features a broad representation of temperate plants, sandy soil and sometimes complex microtopographic features. Plant species richness is lower than some floodplain forests but generally moderate to high. This ecosystem may provide habitat for rare plants such as Canada wood nettle, wild leek, hooked agrimony and blue cohosh. Small ox bow swamps and inactive riparian channels are often embedded within this ecosystem, providing favourable habitat for a broad variety of insects and vertebrates. This ecosystem often includes large mast and cavity trees such as oak, black cherry and white ash. It also may support impressively large ironwood trees. Similar to other riparian forests, intact stands help reduce the effects of flooding and erosion, provide structure and woody material to aquatic systems, and promote riparian connectivity. Old growth potential is generally reduced in this VT, but it is higher for the sugar maple variant.

Characteristic Plants

	FP2		FP2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red maple	100	36.2	100	12.3
Red oak	100	26.0	100	29.0
Ironwood	100	9.3	67	2.5
Large-tooth aspen	33	19.0		
Sugar maple	33	7.0	100	26.0
Black cherry	33	5.0	67	1.5
White spruce	17	2.0	33	5.0
Serviceberry	17	1.0	33	4.0
White ash	17	1.0	33	1.0
Elm	17	0.1	33	3.0
Beech			33	1.0
White birch			33	4.0
Tree Layer (Mean % Cover)		**83**		**75**
Ironwood	83	8.3	67	6.3
Red maple	83	5.0	33	0.1
Balsam fir	67	2.8		
Black cherry	67	2.1	33	0.1
Red oak	50	5.0	33	0.5
Hawthorns	50	1.3	33	0.1
White pine	50	1.1	33	0.1
White spruce	50	0.4		
Sugar maple	33	3.1	100	2.7
Beaked hazelnut	33	3.0	33	0.1
Choke cherry	33	1.0	67	10.0
White ash	17	10.0	33	2.0
Western poison ivy	17	3.0	67	0.1
Elm	17	0.1	67	0.5
Meadow-sweet	17	0.1	67	0.3
Shrub Layer (Mean % Cover)		**25**		**16**
Nodding trillium	100	1.6	67	1.5
Graceful sedge	100	0.5	67	2.0
Wild lily-of-the-valley	100	0.2		
Calico aster	83	2.6	67	1.5
Lady fern	83	2.5	100	2.7
Bellwort	83	2.0	67	8.0
Meadow-rue	83	0.4	67	1.5
Rough goldenrod	67	2.6	33	33.0
False Solomon's seal	67	0.9		
Bladder sedge	67	0.8	67	1.5
Drooping wood sedge	67	0.8		
Live-forever	67	0.3		
Common speedwell	67	0.1		
Sensitive fern	50	9.0	100	5.2
Sarsaparilla	50	2.3	33	27.0
Wild rye grass	50	1.2	67	3.0
Late goldenrod	50	0.7	100	1.4
White lettuce	50	0.5	33	2.0
Heart-leaved aster	50	0.4	33	2.0
Rose twisted stalk	50	0.1	33	0.1
Dandelion	33	0.1	67	0.1
Jack-in-the-pulpit	33	0.1	67	0.1
Ostrich fern	17	30.0	100	5.0
Black snakeroot	17	0.1	67	1.0
Wood goldenrod			67	5.5
Yellow violet			67	0.6
Cut-leaved avens			67	0.1
Jewelweed			67	0.1
Herb Layer (Mean % Cover)		**54**		**71**

Distinguishing Features

Red oak is a significant component of the overstory. Floodplain features such as seasonally active channels and debris piles are evident. Abundant aster and goldenrod species, sedges and grasses and meadow rue help define this vegetation type.

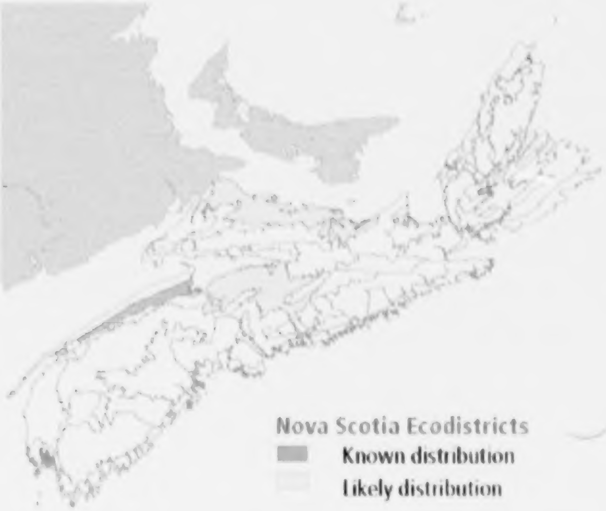
Nodding trillium

Site Characteristics

Slope Position:	Level^{10}
Surface Stoniness:	(Non - Slightly)^{9} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	12 - 39m
Slope Gradient:	Level^{10}
Aspect:	None^{10}
Exposure:	Mod. sheltered^{8} Moderate^{1} nd^{1}
Microtopography:	Level^{3} Slightly^{3} Extremely^{2} Moderately^{2}
Drainage:	Well^{8} Moderately well^{1} nd^{1}

Soil Characteristics

Soil Type:	ST8^{7} nd^{3}
Parent Material:	Alluvium^{10}
Rooting Depth (cm):	(>45)^{3} nd^{7}
Duff Thickness (cm):	(0-5)^{6} nd^{4}



Crowsnest,
Guysborough County

FP3

Red maple / Sensitive fern – Rough goldenrod

Acer rubrum / Onoclea sensibilis –
Solidago rugosa

n=9

Concept: This early to mid successional ecosystem is the most nutrient limited floodplain forest classified in Nova Scotia. The low elevation deciduous forest is characterized by red maple canopy dominance and by a moderately broad group of herbaceous species. Typical understory plants include a mix of floodplain and wetland species.

Vegetation: Canopy layers are usually closed but some stands feature more widely spaced trees. Red maple is the only dominant canopy species, but trace amounts of yellow birch, ironwood, white ash and several conifers may be scattered throughout. The woody understory is usually open with scattered individuals or pockets of wild raisin, beaked hazelnut and regenerating trees. Herbaceous cover is moderate to high depending on available moisture. Dwarf raspberry, sensitive fern, rough goldenrod and bladder sedge are common species. Some occurrences of FP3 support high levels of short husk. Ground bryophyte and lichen cover is absent or reduced.

Environmental Setting: FP3 is mainly associated with fresh to moist, nutrient rich alluvium soils. This Vegetation Type (VT) can be found on active floodplains, low riparian slopes and on inactive terraces. Active sites typically flood annually. Most FP3 sites occur in the middle reaches of rivers found across the province. Rooting zone texture is variable, but sandy loams are most common. FP3 (Red maple / Sensitive fern – Rough goldenrod) occurs across southeastern New Brunswick, but only small, disturbed fragments remain on Prince Edward Island.

Successional Dynamics: FP3 is an early to mid-successional VT. Moister occurrences are expected to persist as an edaphic climax, while stands on better drained sites may succeed to FP1 (Sugar maple – White ash / Ostrich fern – Wood goldenrod). Stands on inactive floodplains or glaciofluvial soils may succeed to an upland forest type. Successional development will depend on available seed sources, site conditions, disturbance regime and geographic location. Disturbance agents include flood events, ice scour, insects and disease, farming and harvesting.

Ecological Features

The Red maple / Sensitive fern – Rough goldenrod is usually on more nutrient-limited floodplains, with lower species richness and reduced productivity, but some stands occur on better sites with increased biodiversity potential. This small patch ecosystem typically supports fewer rare plants than other floodplain forests, with some notable exceptions (e.g. hooked agrimony, Canada wood-nettle and black ash). It is the only forest ecosystem from which the extremely rare false nettle has been documented. The VT supports habitat for numerous riparian vertebrates, while red maple (that flowers before spring leaf out) provides one of the most important early and reliable pollen sources. Similar to other riparian forests, it promotes landscape connectivity, water quality, stream bank stability and channel integrity. Old growth potential is low, except where FP3 forms an edaphic climax on moist sites; in which case a unique form of old growth may develop.

Characteristic Plants	FP3	
	Freq. (%)	Cover (%)
Red maple	100	60.4
Red oak	33	7.3
Sugar maple	33	4.0
Ironwood	33	2.7
White pine	33	2.3
Hemlock	22	7.5
Black cherry	22	6.5
White birch	22	5.5
Balsam fir	22	5.0
Yellow birch	22	4.5
Red spruce	22	3.0
White spruce	22	2.5
Tree Layer (Mean % Cover)		**75**
Red maple	56	5.4
Balsam fir	56	4.0
Serviceberry	56	1.1
Wild raisin	44	10.3
Beaked hazelnut	44	8.5
Sugar maple	44	7.6
Poison ivy	44	1.5
Meadow-sweet	44	0.9
White pine	44	0.6
Red raspberry	44	0.3
Choke cherry	33	19.5
White ash	33	6.2
Red oak	33	3.3
Speckled alder	33	3.3
White spruce	33	1.2
Black cherry	33	0.5
Virgins bower	33	0.1
Shrub Layer (Mean % Cover)		**36**
Meadow-rue	100	1.2
Sensitive fern	78	4.1
Dwarf raspberry	67	3.0
Rough goldenrod	67	0.6
Bladder sedge	67	0.4
Short husk	56	36.4
New York fern	56	7.4
Wild lily-of-the-valley	56	1.1
Partridge-berry	56	0.6
Starflower	56	0.6
Sarsaparilla	44	3.8
Violets	44	1.3
Evergreen wood fern	44	0.8
Lady fern	44	0.3
Bunchberry	33	20.0
Graceful sedge	33	3.3
Calico aster	33	1.0
Rough bedstraw	33	0.7
White panicle aster	33	0.7
Goldthread	33	0.5
Cinnamon fern	33	0.3
Blue flag	33	0.1
Fringed sedge	33	0.1
Nodding trillium	33	0.1
Sweet-scented bedstraw	33	0.1
Stiff sedge	22	13.5
Jewelweed	22	4.0
Herb Layer (Mean % Cover)		**64**

Distinguishing Features

This floodplain vegetation type can be a complex of well to poorly drained sites usually with well-defined seasonally active channels and depressions. Red maple is the dominant overstory species. Sensitive fern, bladder sedge, meadow rue and dwarf raspberry are typically present. Cinnamon fern is scattered but a good indicator.

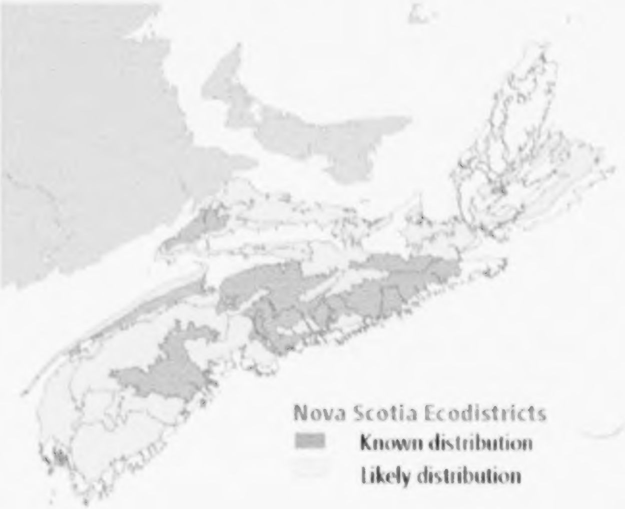
Sensitive fern

Site Characteristics

Slope Position:	Level^{10}
Surface Stoniness:	(Non - Slightly)^{9} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	12 - 93m
Slope Gradient:	Level^{10}
Aspect:	None^{10}
Exposure:	Moderate^{5} Mod. sheltered^{2} nd^{3}
Microtopography:	Level^{7} Moderate^{1} Slightly^{1} nd^{1}
Drainage:	Well^{8} Moderately well^{1} Imperfect^{1}

Soil Characteristics

Soil Type:	ST8^{6} ST8-C^{1} ST9^{1} nd^{2}
Parent Material:	Alluvium^{8} nd^{2}
Rooting Depth (cm):	(>45)^{9} nd^{1}
Duff Thickness (cm):	(0-5)^{7} (11-20)^{1} nd^{2}



Skye Glen,
Inverness County

FP4

Balsam poplar – White spruce / Ostrich fern – Cow-parsnip

Populus balsamifera – Picea glauca /
Matteuccia struthiopteris – Heracleum lanatum

n=7

Concept: The Balsam poplar – White spruce / Ostrich fern – Cow-parsnip forest is an early to mid-successional Vegetation Type (VT) characterized by prominent levels of balsam poplar in the canopy, lesser but frequent white spruce, and a well developed understory. The ecosystem has some boreal affinity, but temperate species like white ash, sugar maple, sensitive fern and alternate-leaved dogwood differentiate it from true boreal floodplains. Many stands have been disturbed and/or reduced in size by human activity, resulting in relatively high shrub density and the frequent presence of plants like wild apple and coltsfoot.

Vegetation: This closed canopy forest is dominated by balsam poplar, with lesser white spruce, white ash and sugar maple. These spruce, ash and maple have a low cover and may be restricted to the understory. Balsam poplar trees have a relatively small crown and most stands have been disturbed. Both these factors increase available light and promote shrub development. Average choke cherry cover is one of the highest of any flooded forest in Nova Scotia. Alternate-leaved dogwood, red-osier dogwood and cow-parsnip also occur more frequently than in other flooded forests. The herbaceous layer is well developed with high fern cover. Ostrich fern, wood goldenrod and cow-parsnip are characteristic. Bryophyte cover is reduced.

Environmental Setting: FP4 is mainly associated with fresh to moist, deep nutrient rich alluvium. It occurs on actively flooded floodplains and low riparian slopes. This VT is usually found in Cape Breton, but can also occur in central and northern areas of the mainland. Annual or biannual flooding is typical, but longer return intervals have been observed. FP4 is found in southeastern New Brunswick but is absent from Prince Edward Island.

Successional Dynamics: The Balsam poplar – White spruce / Ostrich fern – Cow-parsnip forest is an early to mid-successional VT. In cooler areas of the province it may persist as a late successional stage, but elsewhere it will succeed to FP1 (Sugar maple – White ash / Ostrich fern – Wood goldenrod). On less active floodplains, the VT may transition to FP6 (White spruce / Wood goldenrod / Shaggy moss). This dynamic ecosystem follows herb and shrub dominated vegetation types on newly formed floodplains. Disturbance agents include flood events, ice scour, insects and disease, agriculture, cottage development and tree harvesting.

Ecological Features

This northern pioneer floodplain ecosystem provides some of the richest forest habitat in Nova Scotia. It supports numerous rare plants, many of which are largely limited to Cape Breton. These include northern wild licorice, small flowered wood rush, male fern, long-bracted green orchid, squash berry, horse-gentian and giant rattlesnake plantain, among others. The small patch ecosystem may cover several hectares, but most historically large stands have been reduced by past land use activity. Woody understory layers are especially well developed, providing cover, forage and/or nesting habitat for numerous vertebrates. Balsam from poplar buds provides an important source of tree resin collected by bees. Sites are often broken by small channels, shallow depressions, and variable micro-relief; this contributes to the site's structural complexity and important microhabitat. Like other floodplain forests, this ecosystem promotes riparian connectivity, stream bank stability, and helps maintain climatic conditions along the land-water interface.

Characteristic Plants

Characteristic Plants	FP4	
	Freq. (%)	Cover (%)
Balsam poplar	100	41.4
White spruce	100	12.1
Sugar maple	71	6.4
White ash	57	17.3
Elm	29	8.5
Red maple	29	5.0
Ironwood	29	0.5
Tree Layer (Mean % Cover)		**72**
Choke cherry	100	12.9
White ash	86	9.5
Sugar maple	86	8.5
Balsam poplar	86	5.4
Speckled alder	57	8.8
Wild apple	57	3.5
Alternate-leaved dogwood	57	1.1
Elm	43	6.3
White spruce	43	2.4
Red raspberry	43	0.7
Ironwood	29	1.5
Meadow-sweet	29	0.8
Red-osier dogwood	29	0.5
Serviceberry	29	0.3
Balsam fir	29	0.1
Virgins bower	29	0.1
Shrub Layer (Mean % Cover)		**46**
Ostrich fern	100	35.5
Sensitive fern	86	11.4
Wood goldenrod	71	1.9
Cow parsnip	57	8.3
Meadow-rue	57	2.9
Coltsfoot	57	2.0
Creeping buttercup	57	0.8
Jewelweed	43	3.0
Small enchanter's nightshade	43	3.0
Tall white aster	43	1.0
Late goldenrod	43	0.8
Dwarf raspberry	43	0.4
Calico aster	43	0.1
Field horsetail	43	0.1
Lady fern	43	0.1
Long-stalked sedge	43	0.1
Ribless woodland sedge	43	0.1
Large enchanter's nightshade	29	2.6
Agrimony	29	2.3
Bittersweet	29	1.0
White avens	29	1.0
Hooked agrimony	29	0.5
Horse-gentian	29	0.5
Dandelion	29	0.3
Bladder sedge	29	0.1
Blue joint	29	0.1
Brome-like sedge	29	0.1
Common speedwell	29	0.1
Sweet-scented bedstraw	29	0.1
Tall buttercup	29	0.1
Yellow violet	29	0.1
Herb Layer (Mean % Cover)		**56**
Shaggy moss	57	12.8
Bryo-Lichen Layer (Mean % Cover)		**7**

Distinguishing Features

A dominant balsam poplar overstory with a strong understory of shrubs and herbs is typical. Evidence of regular flooding is apparent with debris piles. Choke cherry and alder are usually abundant; red-osier and alternate-leaved dogwoods typically present. Meadow rue, ostrich fern and sensitive fern are very common.

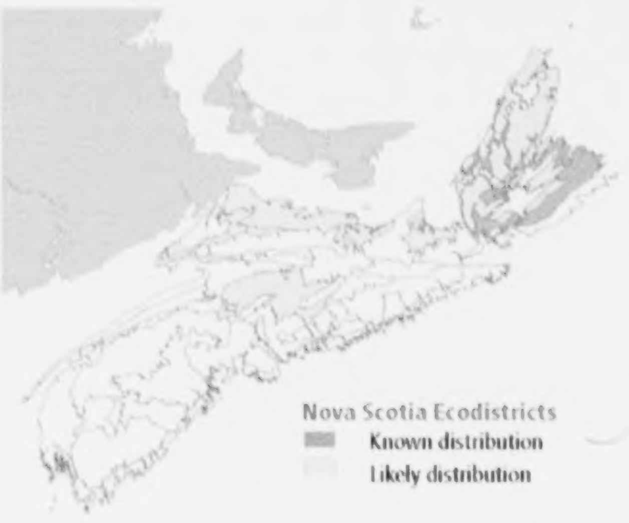
Ostrich fern

Site Characteristics

Slope Position:	Level^{10}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	9 - 60m
Slope Gradient:	Level^{10}
Aspect:	None^{10}
Exposure:	Mod. sheltered^{7} Moderate^{1}
Microtopography:	Level^{10}
Drainage:	Rapid^{6} Well^{7} Moderately well^{1} Imperfect^{1}

Soil Characteristics

Soil Type:	S18C^{6} S18^{1} S19^{1}
Parent Material:	Alluvium^{10}
Rooting Depth (cm):	(30-45)^{1} (>45)^{7}
Duff Thickness (cm):	(0-5)^{4} nd^{6}



Reynolds Bridge,
Upper Stewiacke,
Colchester County

FP5

Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit

Prunus serotina – Acer rubrum / Solidago rugosa – Arisaema triphyllum

n=12

Concept: This relatively uncommon deciduous forest is found on floodplains and river terraces across mainland Nova Scotia. The Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit Vegetation Type (VT) is an early to mid-successional forest characterized by prominent black cherry and by a moderately broad group of floodplain and upland understory species. This is a relatively temperate forest.

Vegetation: Canopy layers are well developed in most FP5 sites, but younger or poorly-developed stands have lower, more widely-spaced, trees. Black cherry is prominent but may co-dominate with red maple or, less often, with white spruce. Other tree species are less common and may be restricted to the understory. The shrub layer is very well developed with the highest mean cover of any flooded forest in Nova Scotia. Black cherry, choke cherry and beaked hazelnut are characteristic of the woody understory. Herbaceous cover is high but composed of a somewhat variable mix of upland and floodplain species. Many associated plants are tolerant of disturbance and may be found on fresh to moist upland soils (e.g. rough goldenrod, dwarf raspberry, red raspberry, tall white aster). Bryophyte development is usually reduced except in less actively flooded sites, where shaggy moss cover may be high.

Environmental Setting: FP5 is mainly associated with fresh to moist, nutrient rich to very rich alluvium soils. Soil depth, texture, and coarse fragment content is somewhat variable, but moderately deep loams, with few coarse fragments and reduced humus accumulation, are typical. The majority of sites are flooded annually or biannually, but some stands occur on infrequently flooded terraces. Most occurrences are in central and northern areas but some are in the Annapolis Valley ecodistrict. Black cherry has been found scattered on floodplains of southern Cape Breton, but because of the small percentage of black cherry on these site, they are not listed as FP5. Canadian occurrences are limited to Nova Scotia and parts of southern New Brunswick.

Successional Dynamics: The Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit forest is expressed at early to mid-successional stages. It may persist, as described, for long durations but most occurrences are expected to succeed to FP1 (Sugar maple – White ash / Ostrich fern – Wood goldenrod) or possibly FP2a (Red maple – Red oak / Bellwort – Nodding trillium variant Sugar maple). The majority of stands are found near agriculture or other disturbed areas. Disturbance agents include flooding, tree harvest, cottage development, domestic animal grazing, ice scour and disease (especially black knot fungus).

Ecological Features

The Black Cherry – Red Maple / Rough Goldenrod – Jack-in-the-pulpit forest is a relatively uncommon temperate pioneer ecosystem. It occurs as a small patch often in, or adjacent to, areas strongly shaped by past land-use activity. The closed canopy stand and its dense woody understory may provide important forage and nesting habitat for riparian wildlife. Beaked hazelnut, an important mast species, is especially common in this forest, but few rare plants are documented (e.g. early leaf brome grass, Philadelphia panic grass, black ash and Canada wood nettle). Larger intact tracts of this forest contribute to riparian connectivity, stream channel stability and aquatic health.

Characteristic Plants	FPS Freq. (%)	FPS Cover (%)
Black cherry	100	38.2
Red maple	75	9.6
White ash	42	11.6
White spruce	33	10.3
Red oak	25	6.7
Balsam fir	25	5.0
Ironwood	25	2.3
Trembling aspen	17	9.0
Serviceberry	17	5.0
Elm	17	3.5
Tree Layer (Mean % Cover)		**64**
Black cherry	83	26.9
Red raspberry	75	4.6
Beaked hazelnut	67	14.1
Choke cherry	58	35.7
Red maple	58	8.9
Speckled alder	58	4.5
Hawthorns	58	1.0
Wild raisin	58	0.9
Alternate-leaved dogwood	50	1.0
Common blackberry	50	0.8
White spruce	42	2.4
White ash	42	1.6
Meadow sweet	42	0.2
Balsam fir	33	5.5
Virgins bower	33	4.6
Highbush cranberry	33	2.4
Shrub Layer (Mean % Cover)		**72**
Sensitive fern	100	11.4
Meadow-rue	92	2.4
Rough goldenrod	83	14.7
Dwarf raspberry	75	11.2
Bladder sedge	67	1.1
Jack-in-the-pulpit	67	0.4
Late goldenrod	58	5.7
Tall white aster	58	5.3
Graceful sedge	58	3.4
Nodding trillium	58	2.4
Brome-like sedge	58	1.2
Live-forever	58	0.3
Lady fern	50	1.5
Violets	50	0.5
Wild lily-of-the-valley	50	0.3
Cut-leaved avens	50	0.1
Ostrich fern	42	4.4
Calico aster	42	1.2
Rough bedstraw	42	1.2
Evergreen wood fern	42	0.3
Canada goldenrod	33	9.6
White avens	33	1.3
Small enchanter's nightshade	33	1.1
Spinulose wood fern	33	0.9
Jewelweed	33	0.6
Strawberry	33	0.4
Wild rye grass	33	0.3
Herb Layer (Mean % Cover)		**68**
Atrichum moss	58	2.9
Shaggy moss	42	11.8
Bryo-Lichen Layer (Mean % Cover)		**7**

Distinguishing Features

Black cherry is required to confirm this vegetation type found on floodplains and river terraces. Asters, goldenrods and sedges are extensive. Sites may not always be flooded annually. Sensitive fern and meadow rue is usually present.

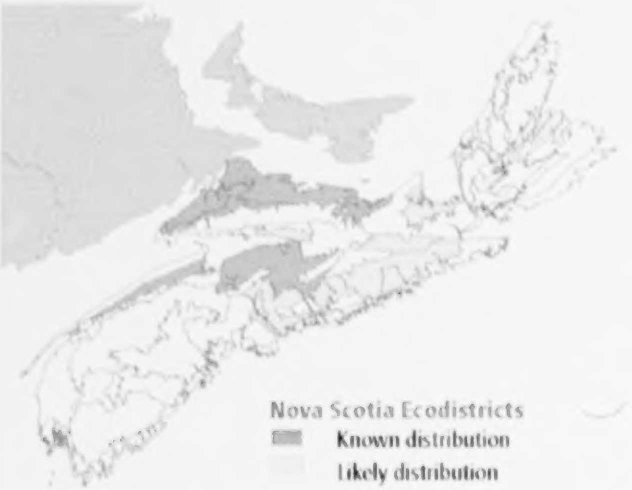
Jack-in-the-pulpit

Site Characteristics

Slope Position:	Level^{10}
Surface Stoniness:	(Non – Slightly)^{9} nd^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	12 – 49m
Slope Gradient:	Level^{10}
Aspect:	South^{1} None^{9}
Exposure:	Mod. sheltered^{1} Moderate^{7} Sheltered^{1} nd^{1}
Microtopography:	Level^{7} Slightly^{2} nd^{1}
Drainage:	Well^{8} Imperfect^{1} nd^{1}

Soil Characteristics

Soil Type:	ST8^{7} ST12^{1} nd^{2}
Parent Material:	Alluvium^{10}
Rooting Depth (cm):	(30-45)^{1} (>45)^{7} nd^{2}
Duff Thickness (cm):	(0-5)^{5} (6-10)^{1} (11-20)^{1} nd^{3}



Wallace River,
Lower Wentworth,
Cumberland County

FP6

White spruce / Wood goldenrod / Shaggy moss

Picea glauca / Solidago flexicaulis / Rhytidiadelphus triquetrus

n=11

Concept: The White spruce / Wood goldenrod / Shaggy moss forest features prominent white spruce, variable shrub and herb development, and moderate to high bryophyte cover. Site conditions suggest this forest floods less frequently and/or for shorter durations than other flooded forest ecosystems in Nova Scotia. The ecosystem has some boreal affinity but differs from boreal floodplain forests by its array of temperate species (e.g. white ash, sugar maple, and plants such as sensitive fern and wood goldenrod).

Vegetation: Canopy layers are heavily dominated by white spruce. Elm, white and yellow birch, white ash, sugar maple and balsam fir may be scattered with low cover or restricted to the understory. Black ash is an infrequent associate. Shrub cover is low to moderate depending on disturbance history, stand size and adjacent land use. Compared to most other flooded forests of Nova Scotia, herbaceous development is relatively low, but more actively flooded, usually moister, and more northern stands support higher herb cover. Mean bryophyte cover is the highest of any flooded forest type. Shaggy moss is the only common species, but some stands support high levels of Atrichum moss.

Environmental Setting: FP6 is mainly associated with fresh to fresh-moist, nutrient rich alluvium soils. This Vegetation Type (VT) is most often found in Cape Breton, but can also occur in central and northern areas of Nova Scotia. Flood cycles are intermittent or of short duration. Soils are usually deep with low coarse fragment content and thin forest floor. FP6 is uncommon across northern and central New Brunswick, but absent from Prince Edward Island.

Successional Dynamics: The White spruce / Wood goldenrod / Shaggy moss forest is an early to mid-successional ecosystem. Stands may succeed shrub and herb dominated vegetation, after floodplain formation, or after some level of human disturbance (usually agriculture). On most sites FP6 is expected to perpetuate or transition to FP4 (Balsam poplar – White spruce / Ostrich fern – Cow parsnip). Stands on relatively inactive floodplains may eventually succeed to an upland forest type. Disturbance agents include flood events, insects and disease (especially spruce bark beetle) and harvesting.

Ecological Features

This ecosystem displays a unique combination of upland and riparian features, and is the only floodplain forest dominated by an evergreen tree species. Infrequent and/or low duration floods promote favourable habitat conditions for ground bryophytes, fungi and some rare vascular plants. Stands may be important deer yards in cooler areas of Cape Breton and northern Nova Scotia. This ecosystem promotes riparian connectivity, reduces erosion of stream channels and banks, and augments levels of coarse woody debris and organic matter into adjacent aquatic habitats. Rare plant potential is low.

Characteristic Plants	FP6 Freq. (%)	FP6 Cover (%)
White spruce	100	50.5
White ash	64	7.9
White birch	36	7.3
Elm	36	2.0
Balsam fir	27	10.3
Yellow birch	27	7.3
Black cherry	18	17.0
Balsam poplar	18	16.0
White pine	18	8.0
Sugar maple	18	6.0
Red maple	18	4.0
Tree Layer (Mean % Cover)		**74**
Sugar maple	91	3.9
White ash	82	17.1
Balsam fir	55	3.7
Red maple	45	2.0
Wild raisin	45	0.1
Choke cherry	36	4.0
Striped maple	36	2.5
Speckled alder	36	1.3
Beaked hazelnut	36	0.8
Fly honeysuckle	36	0.6
White spruce	27	2.5
Yellow birch	27	1.5
Shrub Layer (Mean % Cover)		**26**
Wood goldenrod	73	1.1
Bladder sedge	73	0.7
Sensitive fern	64	3.1
Drooping wood sedge	64	0.9
Meadow rue	64	0.8
Starflower	64	0.1
Ostrich fern	55	2.8
Common speedwell	55	1.0
Calico aster	55	0.3
Coltsfoot	45	3.4
Lady fern	45	2.4
Tall white aster	45	1.9
Evergreen wood fern	45	1.8
Short husk	45	1.0
Wild lily-of-the-valley	45	0.5
Long-stalked sedge	36	2.0
Creeping buttercup	36	0.8
Dwarf raspberry	36	0.8
Wood-sorrel	36	0.8
Red baneberry	36	0.1
Violets	27	20.1
Northern beech fern	27	6.3
Spinulose wood fern	27	3.5
Bloodroot	27	1.7
New York fern	27	1.7
Cow parsnip	27	0.7
Wood aster	27	0.7
Jewelweed	27	0.5
Stinking Willie	27	0.4
Herb Layer (Mean % Cover)		**30**
Shaggy moss	82	36.0
Schreber's moss	45	7.2
Stair-step moss	27	19.0
Bryo-Lichen Layer (Mean % Cover)		**41**

Distinguishing Features

Sites for this softwood forest occupy a floodplain or river terrace setting that is flooded less frequently than other floodplain forest types. Mosses are common, including shaggy, stair-step and Schreber's. Evidence of recent flooding is not always present.

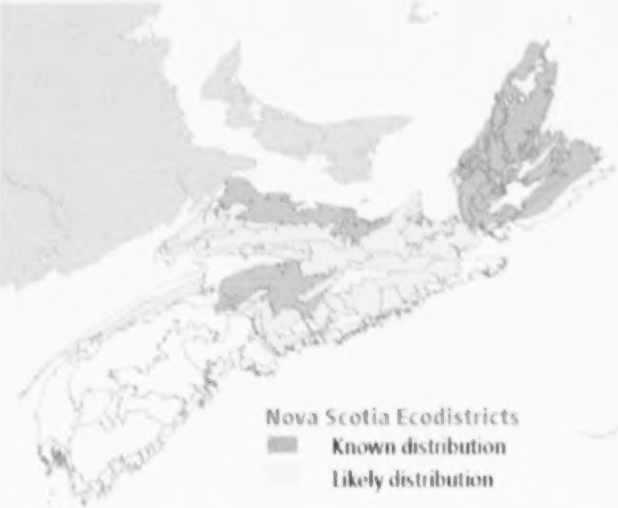
Meadow-rue

Site Characteristics

Slope Position:	Level^{10}
Surface Stoniness:	(Non - Slightly)^{9} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	10 - 96m
Slope Gradient:	Level^{10}
Aspect:	None^{10}
Exposure:	Sheltered^{4} Mod. sheltered^{3} Moderate^{2} nd^{1}
Microtopography:	Level^{8} Slightly^{2}
Drainage:	Well^{4} Imperfect^{3} Moderately well^{2} Rapid^{1}

Soil Characteristics

Soil Type:	ST8^{3} ST9^{3} ST8-C^{2} ST11^{1} nd^{1}
Parent Material:	Alluvium^{10}
Rooting Depth (cm):	(<30)^{1} (30-45)^{2} (>45)^{5} nd^{2}
Duff Thickness (cm):	(0-5)^{8} (6-10)^{1} nd^{1}



HL Highland Forest Group

(n = 51)

HL1 Balsam fir / Mountain-ash / Large-leaved goldenrod. . . . **HL1a** White birch / Wood sorrel variant

HL2 White spruce / Wood aster

HL3 Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel

HL4 Birch / Wood fern – Wood sorrel

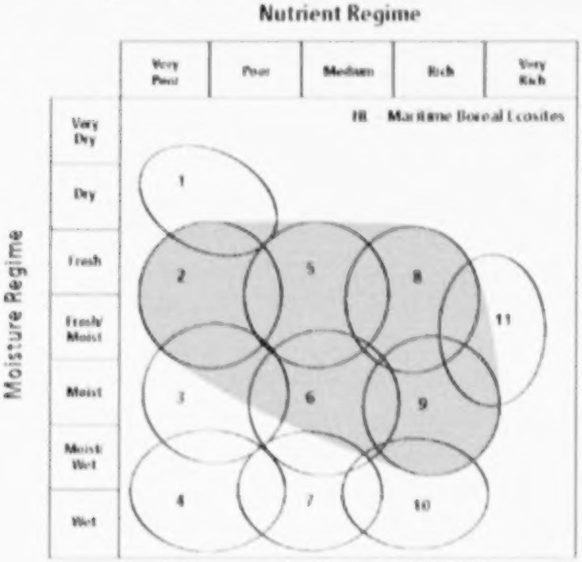
Concept: The composition and vigour of highland forests are influenced by moist, cold climate conditions and exposure associated with the Cape Breton Taiga and Cape Breton Highlands ecoregions. These Vegetation Types (VT) have strong boreal affinity and are considered indicative of Maritime Boreal ecosites. Several plant species are used to indicate this highland influence. Krummholtz and wave forest conditions are also known to occur in association with highland VTs. Fact sheets for these units will be developed as more data are collected. Acadian Ecosite VTs can sometimes be found in sheltered areas within Highland ecoregion boundaries, but these are not recognized as Highland Forest group VTs.

Vegetation: Vegetation types are closed canopy forests. Softwood VTs are dominated by balsam fir and/or white spruce; with yellow birch, white birch and red maple dominating hardwood VTs. Heart-leaf birch is common throughout the group, and mountain-ash can reach tree size in some stands (both species are indicators of highland conditions). In the herb layer, the presence of large-leaf goldenrod is also indicative of this group. The bryophyte layer can be diverse, but the dominant species are Schreber's moss followed by stair-step moss and broom moss.

Environmental Setting: Vegetation types are mainly found on upper flats or upper and middle slopes of variable steepness. High winds associated with these sites generally limit tree growth to under 15 m. Most sites are non-rocky, but surface stoniness can be variable. Soils are mainly derived from glacial till or colluvium deposits. Cool, moist climate conditions slow decomposition rates resulting in sites with unusually thick duff layers. Balsam fir dominated stands form the matrix forest on the Highland plateau, with a transitional balsam fir / yellow birch mixedwood forest found on the shoulder (this mixedwood condition grades into Acadian tolerant hardwood VTs further down slope). The Highland Forest group is restricted to the Cape Breton Taiga (100) ecoregion and Cape Breton Highlands (210) ecodistrict.

Successional Dynamics: This group is associated with Maritime Boreal zonal VTs. Balsam fir dominated forests are even-aged and frequently renewed by either spruce budworm epidemics or through natural senescence (these stands seldom exceed 75 years in age). In yellow birch / balsam fir mixedwood forests, two or more age classes are common – an older yellow birch cohort and a younger balsam fir cohort. Windthrow can be extensive in hardwood dominated ecosystems creating seedbeds for both birch and balsam fir. In more exposed areas, white spruce krummholtz or balsam fir wave forest conditions can be found. Early successional stands mainly contain short-lived pioneer species (pin cherry, mountain ash, raspberry).

Edatopic Grid



Ecological Features

Most ecosystems in this group are boreal, occurring at the southeastern limit of this expansive Canadian forest region. Their closest analogs are in insular Newfoundland and northern New Brunswick. This isolation is one of the group's key characteristics, with significant implications for landscape function, species persistence, migration, and ecosystem integrity. Highland forests collectively form a matrix, occupying well drained sites across the Cape Breton plateau. Balsam fir is a characteristic and often dominant tree in each of the four highland vegetation types. This tree's relatively short life span, coupled with its susceptibility to spruce budworm epidemics, strongly contributes to the dynamics and structure of the boreal landscape. Old growth conditions are largely dependent on yellow birch, supporting a distinctive birch – fir dynamic with limited distribution. The group provides habitat for a number of rare species including American marten, Canada lynx, Bicknell's thrush, boreal felt lichen and black backed woodpeckers; rare plant species are less common.

Cheticamp Plateau,
CBHNP, Inverness County

HL1

Balsam fir / Mountain-ash / Large-leaved goldenrod

Abies balsamea / Sorbus americana / Solidago macrophylla

HL1a

White birch / Wood sorrel variant

Betula papyrifera / Oxalis acetosella

n=32

Concept: This late successional Vegetation Type (VT) has abundant balsam fir with scattered white spruce and birch. The HL1a variant describes stands where white and/or heart-leaf birch co-dominate with balsam fir, in a mixedwood condition. HL1 has stronger boreal affinity than any other mesic VT in Nova Scotia. Balsam fir / Mountain ash / Large-leaved goldenrod is restricted to elevations over 300 meters and is the dominant VT found in the Cape Breton Highlands.

Vegetation: Balsam fir is the dominant overstory tree. Common canopy associates include white spruce, white birch, heart-leaf birch and/or, less often, yellow birch. In variant HL1a, white and/or heart-leaf birch is co-dominant with balsam fir; here, scattered maple (red, sugar, striped) can also occur. The poorly developed shrub layer consists mainly of regenerating balsam fir with lesser mountain ash. In contrast, the herb layer is often well developed, including bunchberry, wood aster, wild lily-of-the-valley, goldthread, wood sorrel, sarsaparilla, bluebead lily and scattered ferns. These same understory species occur in variant HL1a, accompanied by more extensive fern cover (especially wood ferns) and increased sedge presence. Large-leaved goldenrod is characteristic of this VT; it is typically scattered throughout most stands. The bryophyte layer is usually well developed. Schreber's moss is the main species along with broom moss and bazzania. Stair-step moss and sphagnum species may also be found in wetter microsites.

Environmental Setting: HL1 is mainly associated with fresh to moist, nutrient medium soils derived from glacial till. This VT is found over most of the rolling topography of the Cape Breton Highland plateau. Wind and exposure significantly limit tree growth. This ecosystem is common in northern New Brunswick and Quebec's southern boreal forest.

Successional Dynamics: HL1 is an even-aged, late successional VT usually dominated by balsam fir. The main stand level disturbance agents are spruce budworm defoliation and harvesting. In the absence of defoliation or harvesting events, the lifespan of balsam fir in this ecosystem approaches about 75 years, after which tree senescence initiates renewal through advanced regeneration. Clearcut harvesting or, less commonly, fire may initiate an earlier successional stage dominated by pin cherry, white and/or heart-leaf birch, raspberry, mountain-ash and other woody shrubs. Heavy browsing by the moose population is also shaping balsam fir successional patterns, particularly in young post-budworm stands. In most of these, young balsam fir and hardwood saplings have been stripped out, leaving an open grassland of bluejoint and stunted regeneration and limiting HL1 development in the Cape Breton Highlands.

Ecological Features

This matrix community is primarily associated with the Maritime Boreal Cape Breton plateau. The forest's longevity is a function of either natural tree senescence (approximately 75-100 years) or the frequency of spruce budworm epidemics, creating a landscape matrix dominated by a single development stage. Fauna and ground vegetation are characterized by reduced species richness. Subnivean habitat (the space under the snow) is especially critical for the many small mammals, and their predators, found in this forest. The forest floor structure is enhanced by abundant coarse woody debris, raised stumps, and the deep moss characteristic of this VT. These forest conditions are home to snowshoe hare, moose, spruce grouse, boreal chickadee, raven and black-backed woodpecker. Small populations of American marten, Canada lynx and Bicknell's thrush (all listed as species at risk) are restricted largely to these highlands. Mountain ash, an important component of highland forests, often reaches tree size, and provides abundant fruit and browse.

Characteristic Plants	HL1 Freq. (%)	HL1 Cover (%)	HL1a Freq. (%)	HL1a Cover (%)
Balsam fir	100	59.9	100	42.0
White spruce	86	5.6	100	7.0
White birch / Heart leaf birch	55	5.5	100	29.3
Yellow birch	24	3.9		
Red maple	7	2.5	33	4.0
Pin cherry	3	3.0	67	1.0
Mountain-ash	3	0.1	33	0.1
Striped maple	3	0.1	33	12.0
Sugar maple			33	12.0
Tree Layer (Mean % Cover)		**69**		**88**
Balsam fir	90	3.4	33	1.5
Mountain-ash	72	0.4	100	0.1
White birch / Heart leaf birch	59	0.4		
False holly	45	0.7		
White spruce	34	0.3		
Yellow birch	24	0.5	33	2.0
Red maple	17	0.4	33	0.1
Wild red currant	17	0.1	33	0.1
Shrub Layer (Mean % Cover)		**5**		**2**
Bunchberry	93	14.1	100	22.7
Wild lily-of-the-valley	93	2.0	100	2.5
Sarsaparilla	90	1.6	67	1.1
Bluebead lily	83	2.5	67	0.1
Wood aster	83	1.8	100	6.3
Wood sorrel	79	13.8	100	38.3
Goldthread	79	4.2	33	0.5
Starflower	79	0.5	100	0.5
Eastern spreading wood fern	76	3.0	100	25.0
Large-leaved goldenrod	59	0.3	67	0.1
Evergreen wood fern	55	4.3	67	9.0
Twinflower	45	3.3		
Cinnamon fern	45	2.2	67	1.4
Creeping snowberry	45	0.6		
Spinulose wood fern	41	4.6	33	3.0
Indian pipe	34	0.1	33	0.1
Northern beech fern	28	0.2	33	0.5
Hay-scented fern	24	5.9	67	0.8
Interrupted fern	24	0.5	33	0.5
New York fern	21	8.3	33	0.1
White twisted stock	14	0.2	67	0.2
Violets	14	0.1	67	0.3
Bladder sedge	7	0.1	33	0.1
Drooping wood sedge	7	0.1	67	0.1
Soft leaved sedge	7	0.1	33	0.1
Shining club-moss	3	0.1	67	0.1
Herb Layer (Mean % Cover)		**47**		**95**
Schreber's moss	97	40.6	67	15.0
Broom moss	90	5.0	67	12.5
Bazzania	59	5.7	33	0.8
Stair-step moss	48	5.8		
Plume moss	48	1.1		
Ladies' tresses	48	0.7	33	1.5
Hair-cap moss	48	0.5	67	0.4
Shaded wood moss	45	1.6	33	3.0
Wavy dicranum	41	1.4		
Hypnum moss	28	1.8	33	0.5
Common green sphagnum	24	1.4		
Bryo-Lichen Layer (Mean % Cover)		**55**		**21**

Distinguishing Features

This balsam fir dominated softwood forest is described for the Cape Breton Highland plateau. The variant, HL1a, has a significant component of white and/or heart-leaf birch. Large-leaved goldenrod and mountain-ash are usually present.

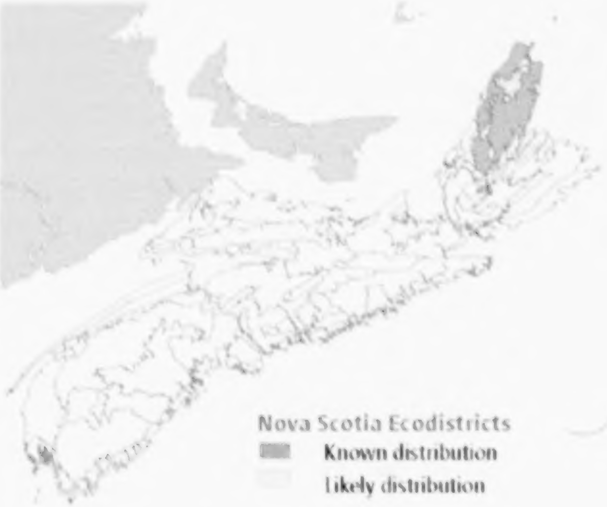
Wild lily-of-the-valley

Site Characteristics

Slope Position:	Level¹ Middle¹ Upper¹ Lower¹
Surface Stoniness:	(Non - Slightly)⁸ (Moderately)²
Bedrock Outcrop:	(Non-rocky)¹⁰
Elevation Range:	139 - 473m
Slope Gradient:	Gentle⁵ Level² Moderate² Steep¹
Aspect:	East² South³ West⁴ None¹
Exposure:	Exposed⁸ Mod. exposed²
Microtopography:	Moderately⁶ Slightly² Level¹ Strongly¹
Drainage:	Moderately well⁴ Imperfect³ Well³

Soil Characteristics

Soil Type:	ST2-L³ ST3³ ST2² ST3-L²
Parent Material:	Glacial till¹⁰
Rooting Depth (cm):	(<30)⁴ (30-45)⁵ (>45)¹
Duff Thickness (cm):	(0-5)¹ (6-10)⁵ (11-20)⁴



Otter Brook
Inverness County

HL2

White spruce / Wood aster

Picea glauca / Aster acuminatus

n=2

Concept: This early to mid-successional Vegetation Type (VT) features abundant white spruce with lesser balsam fir. Understory layers are usually poorly developed with needle carpet forest floors. Conditions that encourage the establishment and renewal of this VT are not well understood, but farmland abandonment is not considered a requirement, despite obvious canopy similarities between this VT and OF1 (White spruce / Aster – Goldenrod / Shaggy moss). White spruce / Wood aster is found scattered throughout the Cape Breton Highlands.

Vegetation: White spruce is the dominant overstory tree, with a component of balsam fir. Yellow birch is a common associate often with white birch, heart-leaf birch and/or red maple. The poorly-developed shrub layer consists mainly of regenerating trees and mountain-ash. Herb layer diversity and abundance are low; only evergreen wood fern and wood aster are common. Species associated with drier sites may also be present including hay scented fern, drooping wood sedge and fibrous root sedge. The bryophyte layer is poorly developed, but usually includes small patches of mainly hypnum moss and broom moss interspersed with needle carpet.

Environmental Setting: HL2 is mainly associated with fresh, nutrient medium soils derived from glacial till and/or colluvium deposits. This VT is found scattered throughout the Cape Breton Taiga ecoregion and Cape Breton Highlands ecodistrict, primarily on steep upper and middle slope positions. Wind and exposure significantly limit tree growth. This relatively uncommon VT is scattered through parts of northern New Brunswick and the southern boreal region of Quebec.

Successional Dynamics: HL2 is an even-aged, early to mid-successional VT dominated by white spruce. Besides harvesting, the main stand level disturbance agents are insect infestation and windthrow. White spruce is somewhat resistant to spruce budworm defoliation, but secondary infestation by bark beetles could cause significant tree mortality. Suitable seedbeds for white spruce regeneration may arise when disturbed sites are re-vegetated by graminoid (grass-type) species (resulting in similar conditions as old field sites). White spruce stand development can also be encouraged by moose browsing (an important successional driver in the highlands) which reduces the presence of more palatable species like balsam fir and various hardwoods, which in turn gives the white spruce more opportunity to establish and thrive. Mid to late successional stages of HL2 may include HL1a (Balsam fir / Mountain-ash / Large-leaved goldenrod variant White birch / Wood sorrel) and HL4 (Birch / Wood fern – Wood sorrel). When found on steep, upper slope and crest positions succession to TH1 (Sugar maple / Hay-scented fern) or TH6 (Red oak – Yellow birch / Striped maple) may also be possible.

Ecological Features

This small to large patch forest is primarily associated with the Maritime Boreal Cape Breton plateau. The ecosystem's longevity is a function of either natural tree senescence (approximately 75-150 years) or the frequency of spruce budworm epidemics. These forest patches may survive budworm outbreaks and provide important remnants of mature forest on the highland landscape. Stands with closed canopies provide shelter for wildlife in winter. White spruce seeds are eaten by crossbills and finches, while small mammals both eat and cache white spruce seeds and cones.

Characteristic Plants

	HL2 ◆	
	Freq. (%)	Cover (%)
White spruce	100	68.0
Balsam fir	100	11.5
Yellow birch	100	6.5
Heart-leaf birch	50	6.0
Red maple	50	3.0
Red oak	50	3.0
White birch	50	3.0
Pin cherry	50	0.1
Tree Layer (Mean % Cover)		**93**
Sugar maple	100	0.1
Balsam fir	50	1.0
Red oak	50	1.0
White birch	50	0.2
Beaked hazelnut	50	0.1
Fly honeysuckle	50	0.1
Mountain ash	50	0.1
Red maple	50	0.1
Red raspberry	50	0.1
Striped maple	50	0.1
White ash	50	0.1
Yellow birch	50	0.1
Shrub Layer (Mean % Cover)		**1**
Evergreen wood fern	100	2.5
Wood aster	100	0.9
Wild lily of the valley	50	8.0
Bent grass	50	3.0
Twinflower	50	2.5
Goldthread	50	2.0
Fibrous-root sedge	50	1.3
Rock polypody	50	1.0
Spinulose wood fern	50	1.0
Sarsaparilla	50	1.0
Wood-sorrel	50	1.0
Bluebead lily	50	0.5
Bunchberry	50	0.3
Large-leaved goldenrod	50	0.2
Drooping wood sedge	50	0.1
Hay-scented fern	50	0.1
Pearly everlasting	50	0.1
Starflower	50	0.1
Herb Layer (Mean % Cover)		**14**
Hypnum moss	100	7.5
Broom moss	100	3.5
Stair-step moss	50	1.0
Schreber's moss	50	0.5
Fern moss	50	0.1
Bryo-Lichen Layer (Mean % Cover)		**12**

Distinguishing Features

This white spruce dominated softwood forest is described for the Cape Breton Highland plateau and its upper slopes. Shrubs, herbs and mosses are poorly expressed. A needle carpet is common.

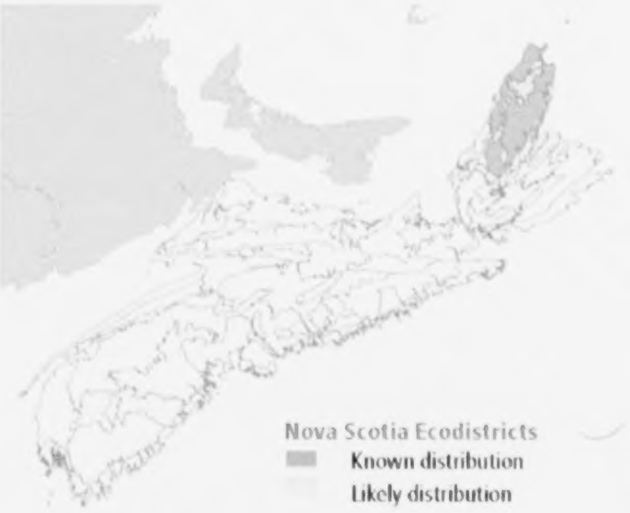
Wood aster

Site Characteristics

Slope Position: Middle^{5} Upper^{5}
Surface Stoniness: (Non - Slightly)^{5} (Very - Excessively)^{5}
Bedrock Outcrop: (Non rocky)^{10}
Elevation Range: 246 - 324m
Slope Gradient: Steep^{5} nd^{5}
Aspect: South^{10}
Exposure: Exposed^{10}
Microtopography: Level^{10}
Drainage: Well^{5} Rapid^{5}

Soil Characteristics

Soil Type: ST2^{10}
Parent Material: Glacial till^{5} Colluvium^{5}
Rooting Depth (cm): (30-45)^{5} (>45)^{5}
Duff Thickness (cm): (6-10)^{10}



Warehouse Road, Hunters Mountain, Victoria County

HL3

Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel

Betula alleghaniensis – Abies balsamea / Dryopteris campyloptera – Oxalis acetosella

n=7

Concept: This mid to late successional Vegetation Type (VT) has an overstory co-dominated by yellow birch and balsam fir, both of which are also significant in the understory. An extensive herb layer dominated by eastern spreading wood fern is also characteristic, especially in more open stands. Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel is the dominant VT found in the Cape Breton Highlands transition zone, an informal ecological term used to describe the area where forest conditions blend between Acadian hardwood slopes and the balsam fir plateau.

Vegetation: Yellow birch and balsam fir are the dominant overstory trees. Common associates include white spruce, white birch, and occasionally red maple, sugar maple, white pine and hemlock. The shrub layer usually includes abundant balsam fir and yellow birch regeneration, as well as mountain maple, striped maple and mountain-ash. The extent and health of the balsam fir overstory strongly influences herb layer development. In more open stands dominated by yellow birch, coverage by eastern spreading wood fern can be abundant, co-occurring with lesser New York fern, evergreen wood fern and bracken. Generally common forest species like bunchberry, wood sorrel, sarsaparilla and bluebead lily may be more plentiful in closed mixedwood conditions. A moderately developed bryophyte layer is dominated by Schreber's moss, bazzania and broom moss.

Environmental Setting: HL3 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils derived from glacial till and/or colluvium deposits. Richer versions of this VT occur where seepage enhances moisture and nutrient status. HL3 is generally confined to well drained upper slopes within the Cape Breton Highlands ecodistrict, usually at elevations ranging from 250-350 meters. Wind and exposure may significantly limit tree growth. This VT is common in northern New Brunswick and marks the northern limit of the temperate zone in the Gaspé Peninsula and other parts of Quebec.

Successional Dynamics: HL3 is a mid to late successional VT dominated by yellow birch and balsam fir. Besides harvesting, the main stand-level disturbance agents are spruce budworm defoliation, windthrow and ice damage. In the absence of defoliation or harvesting, balsam fir in this ecosystem may approach 75 years. After this time tree senescence will initiate stand renewal through advanced regeneration. Yellow birch will eventually succumb to windthrow, breakage and/or dieback associated with storm events and freeze-thaw cycles. HL3 stands are generally represented by two age classes: an older yellow birch cohort and a younger balsam fir cohort. Depending on disturbance history, transition to HL4 (Birch / Wood fern – Wood sorrel) is possible.

Ecological Features

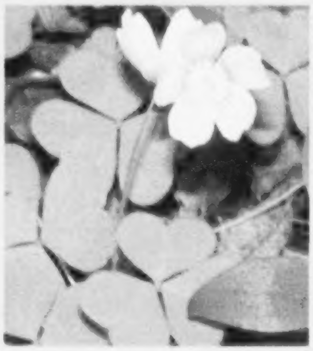
This matrix forest characterizes the transitional zone between the Maritime Boreal Cape Breton plateau and the temperate hardwood slopes. Yellow birch is the province's longest-lived hardwood species (300+ years), and this, along with intermediate shade tolerance, promotes uneven-aged conditions with mature canopy. The balsam fir component is governed by spruce budworm epidemics, however in this mixed forest some fir trees typically survive, resulting in multiple cohorts with rare individuals living up to 175 years. Yellow birch in this ecosystem can grow 17m tall with diameters of 75 cm, many deformed by exposure. Large diameter, living, hollow trees provide good denning and cavity nesting sites, and continue to provide valuable wildlife habitat as large coarse woody debris after they fall. Great-horned owls may take over the former nests made by hawks or ravens in yellow birch. Songbirds such as common redpolls, American goldfinches and pine siskins eat yellow birch seeds, while ruffed grouse eat the seeds, catkins and buds available throughout the winter. These forests may provide nesting habitat for northern goshawk. Old growth potential is high.

Characteristic Plants

	HL3 Freq. (%)	HL3 Cover (%)
Balsam fir	100	37.5
Yellow birch	100	24.8
White spruce	83	9.4
White birch	50	11.7
White pine	33	7.0
Red maple	33	6.0
Sugar maple	17	18.0
Hemlock	17	8.0
Tree Layer (Mean % Cover)		**85**
Balsam fir	100	4.6
Mountain maple	83	1.5
Yellow birch	83	1.4
Striped maple	67	0.4
Red maple	50	8.0
Sugar maple	50	1.6
White spruce	50	1.4
Mountain-ash	50	0.4
Fly-honeysuckle	33	0.1
Red berried elder	33	0.1
Shrub Layer (Mean % Cover)		**16**
Eastern spreading wood fern	100	21.4
Sarsaparilla	100	3.6
Bunchberry	83	8.0
Bluebead lily	83	6.1
Wood aster	83	1.5
Starflower	83	0.2
Rose twisted stalk	83	0.1
Wood-sorrel	67	23.3
Northern beech fern	67	2.5
Wild lily of the valley	67	0.5
Drooping wood sedge	50	0.1
New York fern	33	38.5
Bracken	33	10.0
Violets	33	0.6
Bladder sedge	33	0.1
Goldthread	33	0.1
Large leaved goldenrod	33	0.1
Mayflower	33	0.1
Twinflower	33	0.1
Herb Layer (Mean % Cover)		**62**
Schreber's moss	67	4.3
Bazzania	67	2.3
Broom moss	50	1.8
Shaded wood moss	33	1.3
Stair-step moss	33	0.5
Hair-cap moss	33	0.2
Pin cushion moss	33	0.1
Grey reindeer lichen	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**10**

Distinguishing Features

Yellow birch and balsam fir are dominant in the canopy of this mixedwood forest restricted to the upper slopes of the Cape Breton Highlands ecoregion. The canopy extent of balsam fir is influenced by the timing of the spruce budworm outbreaks. The fern component of the herb layer is well developed with wood fern species.



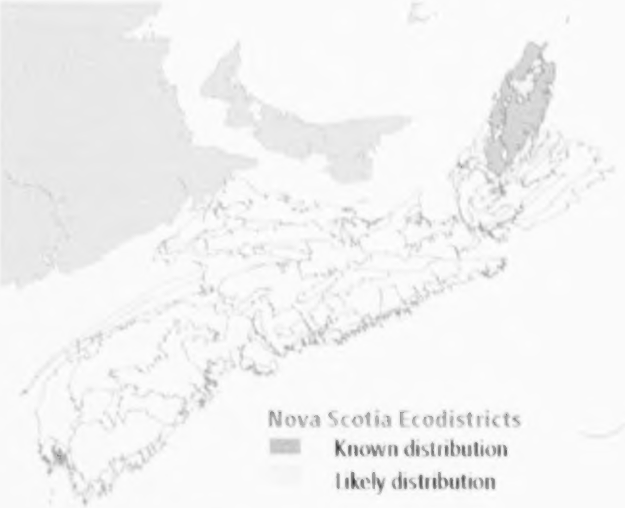
Wood sorrel

Site Characteristics

Slope Position:	Upper^6 Level^3 Middle^1
Surface Stoniness:	(Moderately)^6 (Non - Slightly)^3 (Very - Excessively)^1
Bedrock Outcrop:	(Non-rocky)^7 (Slightly - Moderately)^3
Elevation Range:	174 - 374m
Slope Gradient:	Gentle^5 Steep^3 Moderate^1 Extreme^1
Aspect:	East^3 South^1 West^6
Exposure:	Mod. exposed^6 Exposed^4
Microtopography:	Moderately^5 Slightly^4 Level^1
Drainage:	Well^9 Moderately well^1

Soil Characteristics

Soil Type:	ST2^5 ST2-L^4 ST2-G^1
Parent Material:	Glacial till^7 Colluvium^3
Rooting Depth (cm):	(<30)^1 (30-45)^2 (>45)^6 nd^1
Duff Thickness (cm):	(6-10)^5 (11-20)^4 nd^1



Nova Scotia Ecodistricts

- Known distribution
- Likely distribution

Cape Clear,
Inverness County

HL4

Birch / Wood fern – Wood sorrel

Betula spp. / Dryopteris spp. – Oxalis acetosella

n=10

Concept: This mid to late successional Vegetation Type (VT) has an overstory dominated by birch (yellow, white and occasionally heart-leaf) and an extensive herb layer featuring high wood fern cover. Birch / Wood fern – Wood sorrel often co-occurs with HL3 in the transition zone, an informal ecological term used to describe the blended area where Acadian hardwood slopes and the balsam fir plateau meet in the Cape Breton Highlands ecoregion.

Vegetation: One or more birch species are the dominant overstory trees. Common canopy associates include balsam fir, white spruce and red maple – with fir and spruce sometimes occupying small evergreen pockets established after patch size disturbances. The shrub layer includes regenerating trees, mountain maple, striped maple and mountain-ash. High red raspberry cover may indicate a relatively recent stand-level disturbance. The diverse and well-developed herb layer includes extensive coverage of three wood ferns – eastern spreading, evergreen and spinulose. Sarsaparilla, wood sorrel, wood aster and bunchberry are also commonly found. The bryophyte layer is poorly developed.

Environmental Setting: HL4 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils derived from glacial till and/or colluvium deposits. Richer versions of this VT occur where seepage enhances moisture and nutrient status. HL4 is generally confined to well drained upper slopes within the Cape Breton Highlands ecodistrict, usually at elevations ranging from 250-350 meters. Wind and exposure may significantly limit tree growth. This VT is common in northern New Brunswick and in both the Saguenay and Gaspé regions of Quebec.

Successional Dynamics: HL4 is a mid to late successional VT usually dominated by yellow birch and white birch. Besides harvesting, the main stand-level disturbance agents are windthrow, storm damage and dieback associated with freeze-thaw cycles. An earlier successional stage may include HL2 (White spruce / Wood aster). Depending on disturbance history and the availability of advanced regeneration, transition to HL3 (Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel) is possible. HL4 stands are usually even-aged, but they may show age class breaks, depending on disturbance history.

Ecological Features

Mixtures of white and yellow birch create a mid-successional matrix forest occurring in the transition zone between the Maritime Boreal Cape Breton plateau and adjacent temperate hardwood slopes. Differences in turn-over rates between short-lived white birch and longer-lived yellow birch may result in an uneven-aged stand structure. Yellow birch in this ecosystem can produce stems 17 meters tall with diameters of 75 cm. Large diameter, living, hollow trees are common and provide good denning and cavity nesting sites. They continue to provide valuable wildlife habitat (as large coarse woody debris) after they fall. Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals. Yellow bellied sapsuckers drill both species of birch, eating the sap and the insects attracted to it. At times ruby-throated hummingbirds may work in partnership, defending the holes from other birds. Vireos may be found in this habitat using small strips of birch bark to construct their nests.

Characteristic Plants

Characteristic Plants	HL4 Freq. (%)	HL4 Cover (%)
Yellow birch	64	47.9
White birch	64	21.3
Balsam fir	64	9.6
White spruce	55	9.0
Heart leaf birch	27	66.3
Red maple	27	9.0
White pine	18	4.5
Pin cherry	18	4.0
Sugar maple	9	5.0
Tree Layer (Mean % Cover)		**78**
Balsam fir	91	3.4
Mountain maple	64	3.2
White spruce	64	1.2
Yellow birch	55	2.6
Red maple	55	1.3
Red raspberry	45	1.4
Mountain-ash	45	1.1
Sugar maple	45	0.1
Fly honeysuckle	27	1.1
Red berried elder	27	0.7
Pin cherry	27	0.2
Shrub Layer (Mean % Cover)		**11**
Bunchberry	91	7.3
Wood sorrel	82	13.1
Eastern spreading wood fern	73	27.6
Evergreen wood fern	73	27.3
Wood aster	73	5.4
Starflower	73	0.3
Sarsaparilla	64	2.5
Northern beech fern	64	1.3
Spinulose wood fern	55	17.7
Wild lily-of-the-valley	55	2.5
Bluebead lily	55	2.0
Goldthread	55	1.4
Large-leaved goldenrod	55	0.7
Violets	55	0.6
White twisted stock	45	0.4
Bracken	36	8.3
New York fern	36	3.6
Hay-scented fern	36	3.5
Cinnamon fern	36	1.2
Wood goldenrod	27	0.7
Drooping wood sedge	27	0.1
Herb Layer (Mean % Cover)		**72**
Broom moss	55	0.7
Schreber's moss	55	3.9
Shaded wood moss	55	0.8
Hair cap moss	55	0.2
Stair-step moss	45	8.4
Hypnum moss	36	0.2
Bazzania	27	3.7
Bryo-Lichen Layer (Mean % Cover)		**9**

Distinguishing Features

Yellow birch, white birch and heart-leaf birch create the overstory of this hardwood forest restricted to the upper slopes of the Cape Breton Highlands ecoregion. Three wood ferns (evergreen, eastern spreading and spinulose) provide extensive coverage.

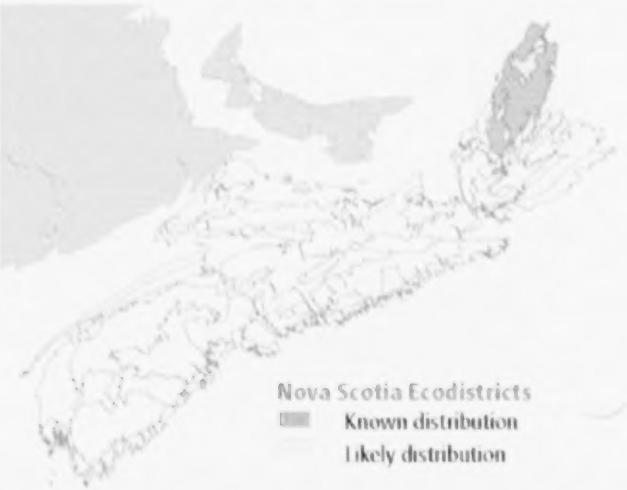
Fern layer

Site Characteristics

Slope Position:	Middle^6 Upper^4
Surface Stoniness:	(Non - Slightly)^6 (Moderately)^2 (Very - Excessively)^2
Bedrock Outcrop:	(Non-rocky)^9 (Slightly - Moderately)^1
Elevation Range:	127 - 439m
Slope Gradient:	Gentle^4 Moderate^3 Steep^2 nd^1
Aspect:	North^2 East^2 South^4 West^2
Exposure:	Exposed^9 Mod. exposed^1
Microtopography:	Moderately^5 Slightly^4 Level^1
Drainage:	Well^6 Moderately well^4

Soil Characteristics

Soil Type:	ST2^3 ST3^2 ST8^2 ST2-G^1 ST2-L^1 ST15^1
Parent Material:	Glacial till^7 Till/Bedrock^2 Colluvium^1
Rooting Depth (cm):	(<30)^3 (30-45)^4 (>45)^3
Duff Thickness (cm):	(6-10)^5 (11-20)^4 (21-40)^1



IH Intolerant Hardwood Forest Group

(n = 145)

IH1	Large-tooth aspen / Lambkill / Bracken	**IH1a** Red oak variant
IH2	Red oak – Red maple / Witch-hazel	**IH2a** Red oak variant
IH3	Large-tooth aspen / Christmas fern – New York fern	
IH4	Trembling aspen / Wild raisin / Bunchberry	
IH5	Trembling aspen – White ash / Beaked hazelnut / Christmas fern	
IH6	White birch – Red maple / Sarsaparilla – Bracken	**IH6a** Aspen variant
IH7	Red maple / Hay-scented fern - Wood sorrel	

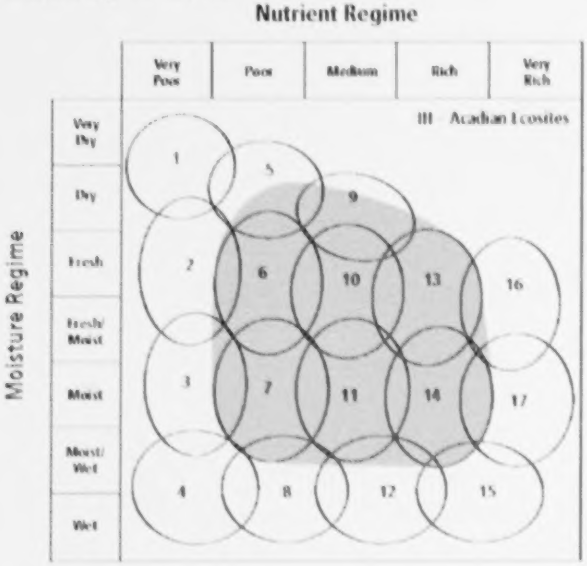
Concept: This group represents early to mid successional hardwood Vegetation Types (VT) found mainly on zonal sites within the Acadian Ecosite group. Red maple, white birch, grey birch and aspens are the dominant species. Vegetation types cover a range of soil moisture and nutrient regimes due (in part) to the ability of hardwoods in this group to adapt rooting patterns to site conditions. Well developed shrub and herb layers along with reduced bryophyte/lichen cover are typical. These are generally short-lived, even-aged forests that result from stand-level disturbance events.

Vegetation: Vegetation types are mainly closed canopy forests dominated by shade intolerant to intermediate hardwoods (red maple, white birch, grey birch, trembling aspen, large-tooth aspen, and to a lesser extent red oak and white ash). Overstory species occur in pure or mixed combinations, often with scattered residuals from the previous stand present. The shrub layer can be extensive with regenerating trees and typical woodland species such as wild raisin, serviceberry and honeysuckle. On poorer sites witch-hazel and ericaceous species will also be present. Herb diversity is usually high but variable depending on site conditions and overstory quality. Poorer sites will have bracken, mayflower and teaberry, whereas better sites will have species such as sarsaparilla, asters, goldenrods and grasses. The bryophyte layer is usually poorly developed.

Environmental Setting: Vegetation types in this group are found on a range of sites – the most broadly defined group in the FEC system. Moisture and nutrient regimes range from dry to moist and poor to rich. Soils are mainly derived from glacial till deposits. This group is found throughout the province as matrix forest or various size patches, although certain VTs are more ecoregion specific (e.g. red oak VTs in the Western (700) ecoregion).

Successional Dynamics: This group is mainly associated with early successional zonal VTs, but some types are more edaphic in nature. Red maple on tolerant hardwood sites should be considered mid-successional. Where red oak occurs this species will continue to form a component of future successional stages due to its longevity. Seed dispersal and clonal/coppice regeneration are two effective strategies that allow intolerant hardwoods to quickly establish themselves in stands that have been disturbed by harvesting, fire, or windthrow. These species also serve as a protective layer as more shade tolerant, late successional species start to regenerate in the understory.

Edatopic Grid



Ecological Features

These are early to mid successional, small to large patch forests. Short-lived overstory species colonize sites rapidly after disturbance acting as a 'nurse crop' for later successional species to develop in the understory. Many trees from this group can stump sprout and/or root sucker enabling stands to perpetuate after repeated disturbances. Sites with extensive ericaceous shrub and bracken cover usually occupy poorer sites, while better sites typically support well developed herb layers and frequent levels of white ash. Mature trees and stumps are prone to infection by shoe-string root rot, a widespread family of parasitic fungi. Regenerating stands provide important browse for deer, moose and snowshoe hare. Stands adjacent to streams are used by beavers to provide food and raw materials for lodge and dam building. Older stands may provide habitat for great crested flycatcher, grey catbird, yellow warbler, chestnut-sided warbler, common yellowthroat and ruffed grouse.

Black River Road
Cumberland County

IH1

Large-tooth aspen / Lambkill / Bracken

Populus grandidentata / Kalmia angustifolium / Pteridium aquilinum

IH1a

Red oak variant

Quercus rubra

n=21

Concept: This early successional Vegetation Type (VT) has an overstory dominated by large-tooth aspen accompanied by a strong component of red maple. The IH1a variant describes stands where red oak is a significant part of the overstory. IH1 has a well-developed understory of disturbance-tolerant woody and herbaceous plants, but reduced bryophyte cover. Large-tooth aspen / Lambkill / Bracken usually follows stand-replacing disturbance events such as fire, windthrow or clearcutting. Most large-tooth aspen originates as vegetative regeneration from root suckers.

Vegetation: Large-tooth aspen and red maple are dominant overstory trees, but the latter species is usually less abundant. White birch, white pine and red oak are common associates – with red oak co-dominant in variant IH1a. The shrub layer is well developed, including wild raisin, serviceberry, velvet-leaf blueberry and bush-honeysuckle. The presence of regenerating balsam fir, red maple, red oak, white pine and black spruce indicate possible successional stages of this ecosystem. In the herb layer, species indicative of poor, dry conditions include bracken, teaberry, round-leaved pyrola, mayflower, pink lady's slipper and/or princes'-pine. The bryophyte layer is poorly developed.

Environmental Setting: IH1 is mainly associated with dry to fresh, nutrient poor soils of glacial origin. Soils and sites are often stony. This VT is found mainly in the Western ecoregion, but is also scattered across mainland Nova Scotia on a variety of soils with low nutrient status. IH1 is common in central and southern New Brunswick but somewhat rare elsewhere in that province and on Prince Edward Island. The VT IH1a is even less common in New Brunswick and absent from Prince Edward Island.

Successional Dynamics: IH1 is an early successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and harvesting. IH1 stands are typically dominated by even-aged, clonal-origin large-tooth aspen. The short-lived aspen will deteriorate due to natural senescence, with mortality further accelerated by insect predation, disease and/or wind damage. Possible successional VTs include IH2 (Red oak – Red maple / Witch-hazel), SP6 (Black spruce – Red maple / Bracken – Sarsaparilla), SP9 (Red oak – White pine / Teaberry) and SH4 (Red spruce – White pine / Lambkill / Bracken).

Ecological Features

This early successional small patch forest is short lived. Large-tooth aspen is a very shade-intolerant tree and its regeneration is primarily through clonal reproduction from root suckers (which may support large fungal associates such as shoe-string root rot). Aspen colonizes sites rapidly after stand-level disturbances. It acts as a "nurse crop" for later successional species that tend to grow up through the aspen, forming two-layered stands before the aspen is overtaken and dies out. Regenerating aspen stands provide cover and forage for many species. Moose and deer feed on its leaves and twigs, ruffed grouse eat its winter buds, snowshoe hare and mice consume its bark and twigs, and beavers make its bark a dietary staple. Resin from aspen buds is the primary source of bee propolis, an essential hive material. Older aspen trees provide soft snags and cavities for several bird species. Aspen support many insects, most notably the forest tent caterpillar which is an important food for birds and small mammals.

Characteristic Plants	IH1		IH1a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Large tooth aspen	100	66.2	100	38.6
Red maple	92	14.0	89	23.5
White pine	54	6.9	22	7.0
White birch	46	4.5	56	6.0
Black spruce	31	5.0	33	11.0
White spruce	31	4.5		
Red oak	31	3.5	100	18.2
Trembling aspen	23	0.1	11	5.0
Balsam fir	15	5.0	22	3.5
Hemlock	15	0.1		
Grey birch	8	2.0	11	4.0
Tree Layer (Mean % Cover)		**89**		**88**
Red maple	92	2.8	78	4.9
Serviceberry	92	0.8	78	0.1
Balsam fir	85	6.3	89	3.0
Wild raisin	85	2.1	78	0.2
Velvet leaf blueberry	77	4.0	78	2.9
Lambkill	69	9.4	89	15.8
Red oak	69	1.3	89	0.7
White pine	69	0.9	67	0.8
Black spruce	54	3.0	67	6.3
Lowbush blueberry	54	2.3	67	1.3
Bush-honeysuckle	54	0.3		
Beaked hazelnut	38	4.4	11	0.1
Striped maple	38	1.1	44	2.8
Witch-hazel	38	0.6	44	12.7
White spruce	31	2.9		
Fly honeysuckle	31	0.2	33	0.8
Large tooth aspen	31	0.2	56	0.8
Beech	15	0.4	22	5.3
Huckleberry	8	0.1	33	12.0
Shrub Layer (Mean % Cover)		**31**		**42**
Sarsaparilla	100	4.6	78	4.0
Wild lily of the valley	100	1.4	89	1.0
Bracken	92	15.3	89	6.9
Teaberry	69	10.6	89	11.9
Starflower	69	3.4	100	1.1
Partridge berry	54	7.2	67	0.3
Bunchberry	54	3.4	67	2.8
Ground pine	54	1.5	11	0.6
Pink lady's slipper	54	0.1	33	0.1
Round-leaved pyrola	46	0.5	22	0.2
Mayflower	38	1.3	44	0.3
Wood aster	38	1.1	33	0.1
Indian cucumber root	38	0.1	33	0.3
Indian pipe	38	0.1	44	0.1
Painted trillium	38	0.1	22	0.1
Bluebead lily	31	0.5	56	0.1
Cow-wheat	31	0.1	22	0.1
Princes' pine	15	0.5	33	0.8
Herb Layer (Mean % Cover)		**35**		**26**
Schreber's moss	77	0.8	89	0.6
Broom moss	62	1.0	78	0.7
Hypnum moss	46	1.0	78	1.2
Hair-cap moss	46	0.8	33	0.8
Wavy dicranum	15	1.1	56	0.2
Stair-step moss	8	0.3	44	1.2
Bryo-Lichen Layer (Mean % Cover)		**2**		**3**

Distinguishing Features

These hardwood forests occur on well drained, nutrient poor sites dominated by large-tooth aspen. Ericaceous shrubs as well as mayflower, teaberry, round-leaved pyrola, bracken fern, pink lady's slipper and princes'-pine are common. Red oak is diagnostic for the variant IH1a.

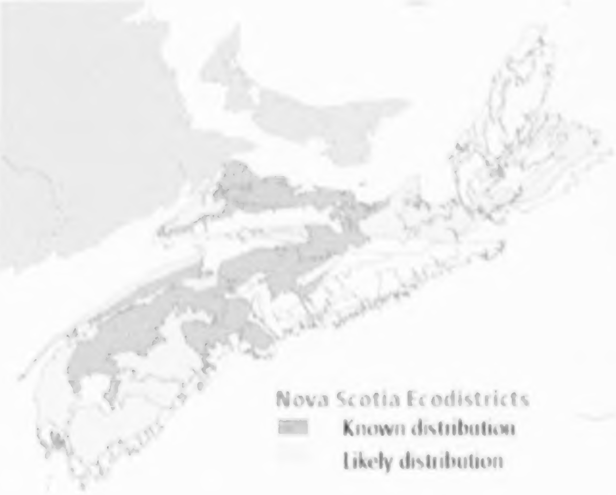
Large-tooth aspen

Site Characteristics

Slope Position:	Level^{5} Middle^{7} Upper^{7} Crest^{1}
Surface Stoniness:	(Non - Slightly)^{6} (Moderately)^{7} (Very - Excessively)^{7}
Bedrock Outcrop:	(Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	15 - 189m
Slope Gradient:	Level^{5} Gentle^{7} Other^{7} nd^{1}
Aspect:	North^{7} East^{1} South^{1} West^{1} None^{4} nd^{1}
Exposure:	Moderate^{7} Mod. exposed^{7} Other^{1}
Microtopography:	Slightly^{5} Moderately^{3} Strongly^{1} Other^{1}
Drainage:	Well^{5} Moderately well^{3} Imperfect^{1} Rapid^{1}

Soil Characteristics

Soil Type:	ST1^{3} ST2^{3} ST2-L^{7} ST6^{1} nd^{1}
Parent Material:	Glacial till^{8} Glaciofluvial^{7}
Rooting Depth (cm):	(<30)^{1} (30-45)^{7} (>45)^{6} nd^{1}
Duff Thickness (cm):	(0-5)^{4} (6-10)^{4} (11-40)^{1} nd^{1}



Holden Lake,
Lunenburg County

IH2

Red oak – Red maple / Witch-hazel

Quercus rubra – Acer rubrum / Hamamelis virginiana

IH2a

Red oak variant

Quercus rubra

n=24

Concept: This early to mid-successional Vegetation Type (VT) has a mixed hardwood overstory with a strong component of red oak. It is the prominence of red oak that distinguishes this unit from other intolerant hardwood VTs. Stands dominated by red oak are described by variant IH2a, a condition that possibly results from earlier fire and/or harvesting disturbances. Red oak – Red maple / Witch-hazel usually follows stand-replacing disturbance events and is almost exclusively a Western ecoregion VT. Sometimes embedded within an IH2 site is the woodland OW5 (Red oak / Huckleberry / Cow-wheat – Rice grass / Reindeer lichen).

Vegetation: Red oak, red maple and white birch are the dominant overstory trees, along with occasional large-tooth aspen, black spruce and balsam fir. The overstory may also include a few scattered white pine in a super canopy position. These relict trees are usually survivors of past disturbance events. The shrub layer is well developed, often including wild raisin, serviceberry, velvet-leaf blueberry, witch-hazel and/or lambkill, along with regenerating trees (especially red oak, red maple, balsam fir and white pine). In the herb layer species indicative of poor, dry conditions include bracken, teaberry, round-leaved pyrola, mayflower, pink lady's slipper and/or princes' pine. The bryophyte layer is poorly developed.

Environmental Setting: IH2 is mainly associated with dry to fresh, nutrient poor soils of glacial origin. Soils and sites are often stony. This VT is abundant throughout the Western ecoregion, especially in the South Mountain, Western Barrens, Rossignol and Sable ecodistricts. It is also occasionally found in central Nova Scotia on a variety of soils with low nutrient status. This VT is relatively rare in New Brunswick, where it is largely restricted to the south. It is extremely uncommon on Prince Edward Island.

Successional Dynamics: Relatively dry, nutrient poor soils associated with this VT may lead to an edaphic climax community dominated by red oak, white pine and black spruce. Historically, stand maintaining fires would have reduced understory fuel loads and promoted red oak and possibly white pine presence until the overstory was destroyed by intense canopy fire. (Although the role of low intensity fires in red oak development is not well understood, it appears to be an important component of successional history in some stands.) IH2 can develop from IH1 (Large-tooth aspen / Lambkill / Bracken) stands and, once established, can maintain itself or transition to SP9 (Red oak – White pine / Teaberry). As the potential impacts of fire are reduced through management, IH2 could succeed to SP4 (White pine / Blueberry / Bracken) or on better sites to SH4 (Red spruce – White pine / Lambkill / Bracken).

Ecological Features

This early to mid-successional large patch forest occurs primarily in western Nova Scotia. Red oak is intermediate in shade tolerance and may occur in both the understory and overstory. This tree is a valuable mast producer for wildlife species including small mammals, bear, ruffed grouse and deer. Growth of oak regeneration may be enhanced by understory fire, which promotes vigorous sprouting from seedlings and saplings and gives them a competitive advantage. Red maple regenerates quickly as coppice and is a favoured browse by deer and moose. Mature red maple flower before most other spring plants, providing one of the most important early and abundant pollen and nectar sources for a wide range of insects. Oak is the preferred host of maitake (or hen-of-the-woods) mushroom.

Characteristic Plants	IH2		IH2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red oak	100	32.2	100	59.4
Red maple	100	31.3	93	14.1
White pine	58	5.7	29	2.3
White birch	50	9.2	43	7.3
Balsam fir	50	7.0	7	3.0
Black spruce	25	10.0	29	3.8
Yellow birch	25	6.7	7	15.0
Red spruce	17	25.0	14	0.5
Beech	17	12.5	7	2.0
Sugar maple	17	4.5	14	1.5
Large-tooth aspen	8	15.0	14	11.5
White spruce			14	2.5
Tree Layer (Mean % Cover)		**87**		**83**
Red maple	100	2.5	93	6.5
Red oak	100	2.4	86	6.3
Balsam fir	75	9.0	43	1.4
Wild raisin	75	0.6	71	1.9
Velvet leaf blueberry	67	4.3	79	7.0
White pine	67	0.7	50	5.4
Red spruce	58	4.2	36	0.5
Witch-hazel	50	11.3	64	2.8
Black spruce	42	6.5	36	2.9
Lambkill	42	3.0	79	10.1
Serviceberry	42	2.1	43	0.3
Striped maple	33	9.0	29	2.8
Beech	33	4.3	21	3.4
Huckleberry	25	7.3	43	16.5
Sugar maple	25	1.9	14	2.5
Lowbush blueberry	17	2.8	64	11.3
Large-tooth aspen			21	0.5
Shrub Layer (Mean % Cover)		**38**		**41**
Sarsaparilla	100	2.5	57	3.0
Wild lily-of-the-valley	92	1.2	64	1.1
Bracken	83	5.2	79	11.9
Starflower	83	1.3	93	0.3
Bunchberry	75	3.5	57	0.8
Partridge-berry	67	4.0	50	0.8
Mayflower	67	0.8	36	2.6
Teaberry	67	0.2	57	22.1
Bluebead lily	58	0.7	21	0.1
Indian cucumber root	58	0.3	43	0.4
Indian pipe	58	0.1	36	0.1
Goldthread	50	2.1	7	2.0
Pink lady's slipper	42	0.2	21	0.1
Wood aster	42	0.1	14	0.5
Princes' pine	33	0.6	14	3.1
Painted trillium	33	0.1	36	0.3
Twinflower	25	3.3	14	10.0
Interrupted fern	25	0.2	14	19.1
Hay-scented fern	25	0.1	14	21.5
Lions paw			29	1.8
Herb Layer (Mean % Cover)		**19**		**43**
Broom moss	92	1.6	86	0.8
Hypnum moss	83	2.5	71	1.4
Stair-step moss	67	1.3	14	1.6
Schreber's moss	58	1.4	71	2.4
Grey reindeer lichen	25	0.2	29	7.5
Bryo-Lichen Layer (Mean % Cover)		**6**		**8**

Distinguishing Features

This hardwood forest occurs on well drained, nutrient poor sites dominated by red oak and red maple. Ericaceous shrubs, as well as mayflower, teaberry, round leaf pyrola, bracken fern, pink lady's slipper and princes'-pine are common. Red oak is diagnostic for the variant IH2a.

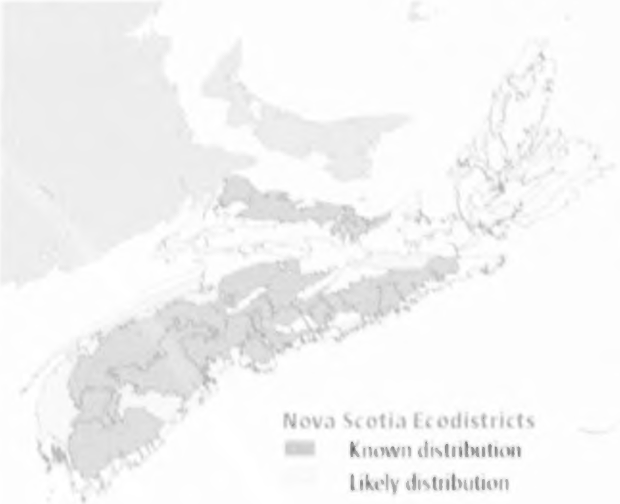
Witch-hazel

Site Characteristics

Slope Position:	Upper^{4} Middle^{1} Other^{1}
Surface Stoniness:	(Moderately)^{5} (Very - Excessively)^{1} (Non - Slightly)^{1}
Bedrock Outcrop:	(Non rocky)^{8} (Slightly - Moderately)^{7}
Elevation Range:	11 - 184m
Slope Gradient:	Gentle^{7} Level^{1} Moderate^{1} nd^{1}
Aspect:	North^{1} East^{1} South^{2} West^{2} None^{1}
Exposure:	Moderate^{5} Mod. exposed^{5}
Microtopography:	Slightly^{4} Moderately^{4} Strongly^{7}
Drainage:	Well^{7} Moderately well^{7} Other^{1}

Soil Characteristics

Soil Type:	ST2^{4} ST2-G^{1} ST2-L^{7} ST6^{1} nd^{1}
Parent Material:	Glacial till^{8} nd^{7}
Rooting Depth (cm):	(<30)^{1} (30-45)^{1} (>45)^{5} nd^{1}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{1} (11-20)^{7} nd^{1}



Lily Lake
Annapolis County

IH3

Large-tooth aspen / Christmas fern – New York fern

Populus grandidentata / Polystichum acrostichoides – Thelypteris noveboracensis

n=12

Concept: This early successional Vegetation Type (VT) has an overstory dominated by large-tooth aspen and a variable mix of shade-tolerant hardwood species, balsam fir and red spruce. It is similar to IH1 (Large-tooth aspen / Lambkill / Bracken) but it is found on richer sites, as evidenced by a change in herbaceous cover and tree species composition. Large-tooth aspen / Christmas fern – New York fern usually follows stand-replacing disturbance events such as fire, windthrow or clearcutting. Most large-tooth aspen originates as vegetative regeneration from root suckers.

Vegetation: Large-tooth aspen is the dominant overstory tree, but a variety of other species can also be found including red maple, sugar maple, yellow birch, white ash, balsam fir and red spruce (among others). The shrub layer is moderately developed and includes regenerating trees, fly-honeysuckle, serviceberry and wild raisin. The herb layer has many plants indicative of moist and/or fertile site conditions including interrupted fern, New York fern, sensitive fern, bladder sedge, Christmas fern, lady fern, oak fern and large-leaved aster. The bryophyte layer is poorly developed.

Environmental Setting: IH3 is mainly associated with fresh to moist, nutrient medium to rich soils of variable texture. This VT is found scattered throughout western and central Nova Scotia. IH3 is relatively uncommon across southern New Brunswick and on Prince Edward Island.

Successional Dynamics: IH3 is an early successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and harvesting. IH3 stands are usually dominated by even-aged, clonal-origin large-tooth aspen. Short-lived aspen will deteriorate due to natural senescence, with mortality further accelerated by insect predation, disease and/or wind damage. A mix of shade-tolerant softwoods and hardwoods in the shrub layer allows for a range of possible successional VTs including IH7 (Red maple / Hay-scented fern – Wood sorrel), MW1 (Red spruce – Yellow birch / Evergreen wood fern), MW3 (Hemlock – Yellow birch / Evergreen wood fern), SH3 (Red spruce – Hemlock / Wild lily-of-the-valley), TH1 (Sugar maple / Hay-scented fern), TH2 (Sugar maple / New York fern – Northern beech fern), TH3 (Sugar maple – White ash / Christmas fern), and in western Nova Scotia TH6 (Red oak – Yellow birch / Striped maple).

Ecological Features

This early successional small patch forest is short lived. Large-tooth aspen is a very shade-intolerant tree and its regeneration is primarily through clonal reproduction from root suckers (which may support large fungal associates such as shoe-string root rot). Aspen colonizes sites rapidly after stand-level disturbances acting as a "nurse crop" for later successional species that tend to grow up through the aspen, forming two-layered stands before the aspen is overtaken and dies out. Regenerating aspen stands provide cover and forage for many species. Moose and deer feed on its leaves and twigs, ruffed grouse eat its winter buds, snowshoe hare and mice consume its bark and twigs, and beavers make its bark a dietary staple. Resin from aspen buds is the primary source of bee propolis, an essential hive material. Older aspen trees provide soft snags and cavities for several species of birds. Aspen support many insects, most notably the forest tent caterpillar, which is an important food for birds and small mammals.

Characteristic Plants	IH3	
	Freq. (%)	Cover (%)
Large tooth aspen	100	54.5
Red maple	83	10.2
Balsam fir	58	8.1
Red spruce	50	6.8
Sugar maple	50	6.4
White ash	42	4.1
Yellow birch	33	5.0
White birch	33	4.0
Red oak	33	3.8
Beech	25	14.0
White pine	25	1.7
Trembling aspen	17	37.5
White spruce	17	7.5
Striped maple	17	5.5
Tree Layer (Mean % Cover)		**90**
Balsam fir	92	4.6
Red maple	83	0.4
Fly-honeysuckle	67	0.7
Striped maple	50	3.0
Red spruce	50	1.9
Large-tooth aspen	50	1.0
Sugar maple	50	0.9
Beech	42	2.5
White ash	42	2.2
Serviceberry	42	0.4
Wild raisin	42	0.2
Red oak	42	0.1
White pine	42	0.1
Yellow birch	33	7.4
Shrub Layer (Mean % Cover)		**14**
Wild lily-of-the-valley	92	1.7
Starflower	92	1.4
Sarsaparilla	75	3.8
Bluebead lily	67	1.3
Hay-scented fern	58	3.0
New York fern	58	1.3
Bracken	58	1.0
Christmas fern	58	0.8
Interrupted fern	58	0.7
Wood aster	58	0.6
Drooping wood sedge	50	0.2
Evergreen wood fern	42	0.1
Violets	42	0.1
Oak fern	33	1.3
Rose twisted stalk	33	0.1
Bristly club-moss	25	0.7
Sensitive fern	25	0.5
Cinnamon fern	25	0.4
Hawkweeds	25	0.4
Herb Layer (Mean % Cover)		**14**
Broom moss	83	0.4
Schreber's moss	67	0.6
Hair cap moss	67	0.4
Stair-step moss	58	2.8
Hypnum moss	42	0.5
Wavy dicranum	33	0.5
Bazzania	33	0.1
Shaggy moss	25	11.7
Bryo-Lichen Layer (Mean % Cover)		**6**

Distinguishing Features

This hardwood forest occurs on well to imperfectly drained, nutrient rich soils and is dominated by large-tooth aspen. Moist site indicators include interrupted fern, cinnamon fern, sensitive fern, bladder sedge, other sedge species and buttercups. Rich site indicators are Christmas fern, lady fern and large leaf aster.

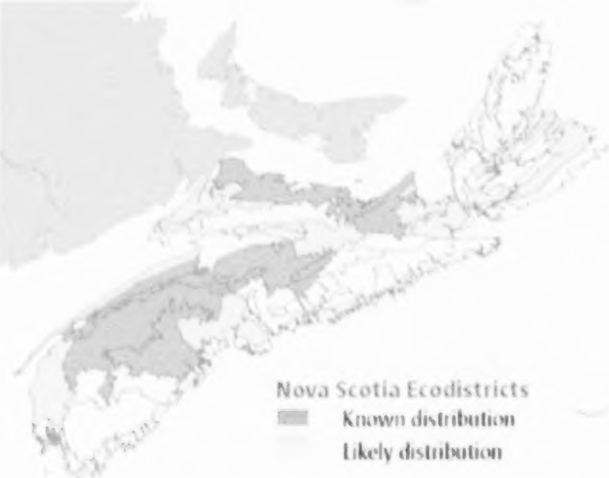
New York fern
[John Gilis]

Site Characteristics

Slope Position:	Level^{6} Lower^{2} Middle^{2} Upper^{2}
Surface Stoniness:	(Non - Slightly)^{6} (Moderately)^{3} (Very - Excessively)^{1} nd^{2}
Bedrock Outcrop:	(Non-rocky)^{8} nd^{4}
Elevation Range:	33 - 190m
Slope Gradient:	Gentle^{6} Level^{3} Moderate^{3}
Aspect:	North^{1} East^{2} South^{1} None^{7}
Exposure:	Moderate^{6} Mod. exposed^{2} nd^{4}
Microtopography:	Slightly^{4} Moderately^{2} Strongly^{2} nd^{4}
Drainage:	Moderately well^{5} Imperfect^{2} Poor^{1} nd^{4}

Soil Characteristics

Soil Type:	ST12^{3} ST8^{2} ST11^{2} ST9^{1} ST2-L^{1} nd^{3}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(30-45)^{3} (>45)^{2} nd^{7}
Duff Thickness (cm):	(0-5)^{5} (6-10)^{3} nd^{4}



Denmark,
Colchester County

IH4

Trembling aspen / Wild raisin / Bunchberry

Populus tremuloides / Viburnum nudum / Cornus canadensis

n=15

Concept: Trembling aspen / Wild raisin / Bunchberry forest is an early successional Vegetation Type (VT) dominated by trembling aspen with a strong component of red maple and balsam fir. This VT has a well-developed understory of disturbance-tolerant woody and herbaceous plants, but reduced bryophyte cover. Trembling aspen / Wild raisin / Bunchberry usually follows stand-replacing disturbances events such as fire, windthrow or clearcutting.

Vegetation: Trembling aspen is the dominant overstory tree, with a lesser component of red maple and balsam fir. White spruce, white birch and red spruce are common canopy associates. The shrub layer is often well developed and includes red maple and balsam fir regeneration as well as woody shrubs like wild raisin, lambkill and blueberry species. A variety of plants can be found in the herb layer, but common species are limited to wild lily-of-the-valley, starflower, bunchberry, twinflower, wood aster and bracken. The bryophyte layer is poorly developed but Schreber's moss and broom moss are usually present.

Environmental Setting: IH4 is mainly associated with fresh to moist, nutrient medium soils of glacial origin. This VT is found primarily in the Valley/Central and Northumberland Bras d'Or Lowlands ecoregions. This VT is common on Prince Edward Island and, excluding the highlands, widespread and abundant across much of New Brunswick.

Successional Dynamics: IH4 is an early successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and harvesting. IH4 stands are usually dominated by even-aged, clonal-origin trembling aspen. Short-lived aspen will deteriorate due to natural senescence, with mortality further accelerated by insect predation, disease and/or wind damage. Possible successional VTs include softwood or mixedwood types such as SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum) and MW1 (Red spruce – Yellow birch / Evergreen wood fern). On Cape Breton Island MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread) and SH8 Balsam fir / Wood fern / Schreber's moss) are more likely.

Ecological Features

This early successional small patch forest is short lived. Trembling aspen is a very shade-intolerant tree and regenerates primarily through clonal reproduction from root suckers (which may also support large fungal associates such as shoe-string root rot). Aspen colonizes sites rapidly after stand-level disturbances acting as a "nurse crop" for later successional species that tend to grow up through the aspen. This forms two-layered stands before the aspen is overtaken and dies out. Regenerating aspen stands provide cover and forage for many species. Moose and deer feed on its leaves and twigs, ruffed grouse eat its winter buds, snowshoe hare and mice consume its bark and twigs, and beavers make its bark a dietary staple. Resin from aspen buds is the primary source of bee propolis, an essential hive material. Older aspen trees provide soft snags and cavities for several species of birds. Aspen support many species of insects, most notably the forest tent caterpillar, which is an important food for birds and small mammals.

Characteristic Plants	IH4	
	Freq. (%)	Cover (%)
Trembling aspen	100	55.7
Red maple	93	8.1
Balsam fir	60	16.7
White birch	47	13.0
White spruce	47	1.7
Black spruce	27	9.0
Red spruce	27	7.5
Large-tooth aspen	20	6.7
White pine	20	3.0
White ash	20	0.1
Grey birch	13	10.0
Hemlock	7	5.0
Striped maple	7	4.0
Yellow birch	7	3.0
Mountain ash	7	0.1
Tree Layer (Mean % Cover)		**88**
Red maple	93	8.5
Wild Raisin	87	2.5
Balsam fir	80	6.6
Trembling aspen	67	2.8
Lambkill	40	2.6
White ash	40	1.5
Serviceberry	40	0.5
Velvet-leaf blueberry	33	15.3
Lowbush blueberry	33	3.1
Black spruce	33	1.2
White pine	33	0.5
Striped maple	27	10.2
Bush-honeysuckle	27	1.5
False holly	27	0.3
Shrub Layer (Mean % Cover)		**32**
Wild lily-of-the-valley	80	1.3
Bunchberry	73	11.0
Starflower	73	0.8
Bracken	60	7.9
Twinflower	53	3.8
Wood aster	53	0.7
Sarsaparilla	47	2.9
Evergreen wood fern	47	0.5
Cinnamon fern	40	4.2
Interrupted fern	40	0.8
Bluebead lily	33	0.2
Drooping wood sedge	33	0.1
Goldthread	33	0.1
Shinleaf	33	0.1
Teaberry	27	3.5
Dwarf raspberry	27	1.8
Partridge-berry	27	0.7
New York fern	27	0.1
Herb Layer (Mean % Cover)		**30**
Schreber's moss	73	2.8
Broom moss	73	0.6
Stair step moss	60	1.8
Bazzania	53	0.9
Shaggy moss	47	1.9
Wavy dicranum	47	0.3
Hair cap moss	33	4.2
Hypnum moss	27	0.2
Bryo-Lichen Layer (Mean % Cover)		**7**

Distinguishing Features

These hardwood forests are dominated by trembling aspen with a strong component of red maple and balsam fir. Aspen root suckers are common in the shrub layer.

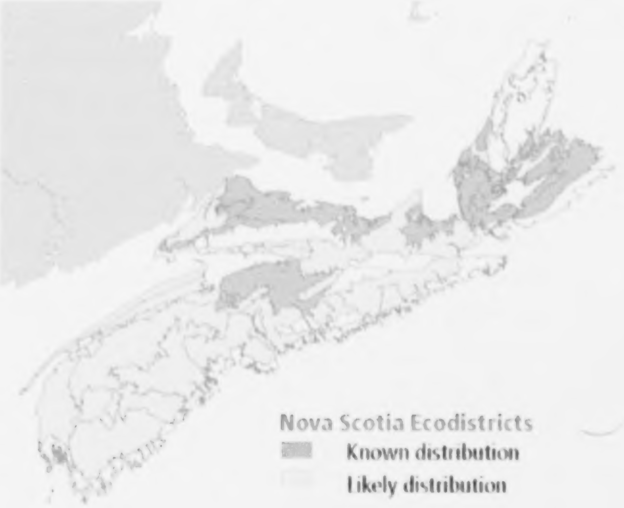
Bunchberry

Site Characteristics

Slope Position: Level^{5} Upper^{3} Lower^{1} Middle^{1}
Surface Stoniness: (Non – Slightly)^{9} (Moderately)^{1}
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 14 – 123m
Slope Gradient: Gentle^{5} Level^{4} nd^{1}
Aspect: North^{1} South^{3} West^{2} None^{4}
Exposure: Moderate^{10}
Microtopography: Moderately^{3} Slightly^{3} Strongly^{3} Level^{1}
Drainage: Imperfect^{5} Moderately well^{4} Well^{1}

Soil Characteristics

Soil Type: ST6^{5} ST2^{2} ST3^{1} ST31^{1} ST9^{1}
Parent Material: Glacial till^{10}
Rooting Depth (cm): (<30)^{1} (30-45)^{6} (>45)^{2} nd^{1}
Duff Thickness (cm): (0-5)^{1} (6-10)^{7} (11-20)^{1} nd^{1}



Nova Scotia Ecodistricts
▨ Known distribution
░ Likely distribution

Angevine Lake
Cumberland County

IH5

Trembling aspen – White Ash / Beaked hazelnut / Christmas fern

Populus tremuloides – Fraxinus americana / Corylus cornuta / Polystichum acrostichoides

n=9

Concept: This early to mid-successional Vegetation Type (VT) has an overstory co-dominated by trembling aspen and white ash with lesser amounts of red maple and yellow birch. It is similar to IH4 (Trembling aspen / Wild raisin / Bunchberry) but is found on somewhat richer sites, as evidenced by associated shifts in herbaceous cover and tree species composition. Trembling aspen – White ash / Beaked hazelnut / Christmas fern usually follows stand-replacing disturbance events such as fire, windthrow or clearcutting.

Vegetation: Trembling aspen dominates the overstory with a significant component of white ash. Lesser amounts of yellow birch, red maple, sugar maple and balsam fir are also common. The shrub layer is moderately developed and includes regenerating white ash and balsam fir along with beaked hazelnut and fly-honeysuckle. The herb layer has many plants indicative of moist and/or fertile site conditions including interrupted fern, New York fern, sensitive fern, Christmas fern, large-leaved aster and dwarf raspberry. Although the bryophyte layer is poorly developed, shaggy moss and stair-step moss are usually present.

Environmental Setting: IH5 is mainly associated with fresh to moist, nutrient medium to rich soils of variable texture. This VT is found primarily in the Valley/Central and Northumberland Bras d'Or Lowlands ecoregions. It is common in Prince Edward Island and in the warmer ecoregions of New Brunswick.

Successional Dynamics: IH5 is an early to mid-successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and harvesting. IH5 stands are typically dominated by even-aged, clonal-origin trembling aspen. Depending on the intensity of disturbance, the aspen may perpetuate as an overstory component with little successional advancement of the stand. However, short-lived aspen deteriorate quickly due to natural senescence, insect predation, disease and/or wind damage. Later successional VTs are likely to remain hardwood dominated, although the presence of balsam fir and red spruce may move some stands to a mixedwood forest condition. Possible successional VTs include MW1 (Red spruce – Yellow birch / Evergreen wood fern), MW3 (Hemlock – Yellow birch / Evergreen wood fern), MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread), SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) and TH3 (Sugar maple – White ash / Christmas fern).

Ecological Features

This early successional small patch forest is short lived except for the white ash component that will continue into later successional stages. Trembling aspen is a very shade-intolerant tree and its regeneration is primarily through clonal reproduction from root suckers (which may also support large fungal associates such as shoe-string root rot). Aspen colonizes sites rapidly after stand-level disturbances. It acts as a "nurse crop" for later successional species that tend to grow up through the aspen, forming two-layered stands before the aspen is overtaken and dies out. Regenerating aspen stands provide cover and forage for many species. Moose and deer feed on its leaves and twigs, ruffed grouse eat its winter buds, snowshoe hare and mice consume its bark and twigs, and beavers make its bark a dietary staple. Resin from aspen buds is the primary source of bee propolis, an essential hive material. Older aspen trees provide soft snags and cavities for several species of birds. Aspen support many species of insects, most notably the forest tent caterpillar, which is an important food for birds and small mammals.

Characteristic Plants

	IH5 Freq. (%)	IH5 Cover (%)
Trembling aspen	100	58.8
White ash	89	11.8
Red maple	67	14.7
Yellow birch	56	3.8
Balsam fir	44	25.0
Red spruce	33	9.7
White spruce	22	17.5
Hemlock	22	7.5
Sugar maple	22	7.0
Ironwood	22	2.0
White birch	11	4.0
Black spruce	11	3.0
Tree Layer (Mean % Cover)		**91**
White ash	89	10.8
Trembling aspen	89	2.1
Balsam fir	78	8.4
Red maple	78	2.0
Serviceberry	67	0.2
Beaked hazelnut	56	5.7
Fly honeysuckle	56	3.5
Red spruce	44	0.5
White spruce	33	3.7
Striped maple	33	0.7
Bush honeysuckle	33	0.4
Wild Raisin	33	0.2
Speckled alder	33	0.1
Shrub Layer (Mean % Cover)		**34**
Starflower	89	0.2
Interrupted fern	78	2.2
New York fern	78	1.3
Wild lily-of-the-valley	78	1.2
Bunchberry	67	4.4
Christmas fern	67	0.6
White panicle aster	67	0.4
Large-leaved aster	56	4.1
Evergreen wood fern	56	0.9
Partridge berry	56	0.9
Dwarf raspberry	44	3.4
Lady fern	44	1.3
Strawberry	44	0.6
Sarsaparilla	33	8.3
Sensitive fern	33	3.5
Bracken	33	2.7
Goldthread	33	2.0
Oak fern	33	2.0
Wood aster	33	1.8
Twinflower	33	1.7
Cinnamon fern	33	0.7
Woodland horsetail	33	0.3
Herb Layer (Mean % Cover)		**34**
Shaggy moss	67	4.5
Stair-step moss	56	6.9
Schreber's moss	56	2.3
Broom moss	56	0.7
Hypnum moss	33	3.0
Bazzania	33	0.4
Wavy dicranum	33	0.4
Hair-cap moss	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**11**

Distinguishing Features

These hardwood forests are dominated by trembling aspen with a component of white ash in the overstory, and with richer soils than IH4.

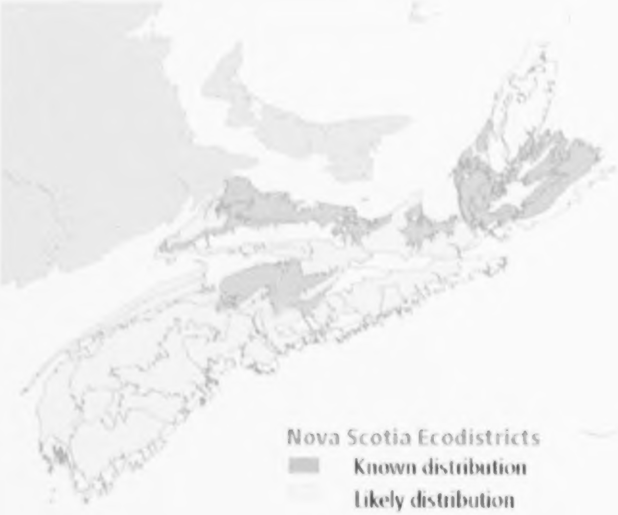
Bristly club-moss

Site Characteristics

Slope Position:	Lower^5 Middle^3 Toe^1 Upper^1
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	34 - 80m
Slope Gradient:	Gentle^8 nd^2
Aspect:	North^4 South^5 nd^1
Exposure:	Moderate^8 Mod. sheltered^1 nd^1
Microtopography:	Slightly^7 Moderately^3
Drainage:	Imperfect^7 Moderately well^3

Soil Characteristics

Soil Type:	ST9^4 ST6^2 ST12^2 ST8^1 ST16^1
Parent Material:	Glacial till^9 Alluvium^1
Rooting Depth (cm):	(<30)^4 (30-45)^3 (>45)^1 nd^2
Duff Thickness (cm):	(0-5)^5 (6-10)^4 nd^1



Nova Scotia Ecodistricts

▨ Known distribution

□ Likely distribution

Black Lake,
Cumberland County

IH6

White birch – Red maple / Sarsaparilla – Bracken

Betula papyrifera – Acer rubrum / Aralia nudicaulis – Pteridium aquilinum

IH6a

Aspen variant

Populus grandidentata – Populus tremuloides

n=46

Concept: This early successional Vegetation Type (VT) has an overstory co-dominated by white birch and red maple, with minor associates. The IH6a variant describes stands where aspen (trembling and/or large tooth) co-dominates with the birch and maple. Together with its variant, IH6 can grow in a wide range of ecological conditions — from dry to moist and poor to rich sites. White birch – Red maple / Sarsaparilla – Bracken usually follows stand-replacing disturbances events such as fire, windthrow or clearcutting.

Vegetation: White birch and red maple are the dominant overstory trees, while aspen species are co-dominant in variant IH6a. Balsam fir, red spruce, white pine, yellow birch and/or white spruce are common canopy associates. The shrub layer is often well developed and includes several regenerating tree species, wild raisin, lambkill, velvet-leaf blueberry, striped maple and serviceberry. A variety of plants can be found in the herb layer, reflecting the range of site conditions supporting this VT. However, the majority of plants are associated with relatively poor fertility and fresh to dry soils. Common herbaceous species include starflower, bunchberry, sarsaparilla, bracken and ground pine. The bryophyte layer is usually poorly developed, but often contains patches of Schreber's moss, hypnum moss on decaying wood, and hair-cap moss on recently disturbed soil.

Environmental Setting: IH6 is associated with a range of site conditions ranging from relatively dry, poor, coarse textured soils to relatively moist, rich, fine textured soils (and combinations in between). This VT is common and widespread throughout the province. This is the most common white birch VT in the Acadian Forest, ranging widely across New Brunswick and Prince Edward Island.

Successional Dynamics: IH6 is an early successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and harvesting. With time, short-lived white birch and aspen will deteriorate due to natural senescence, insects and disease and/or wind damage – leading to a range of possible successional VTs. The presence of other canopy and understory species, particularly residual trees from pre-disturbance conditions, should be used to assess likely successional trends.

Ecological Features

This early successional deciduous forest typically occurs as large patches following stand level disturbances such as fire or tree harvesting. Regeneration is by seed and coppice. White birch is shade-intolerant and is short-lived. The sudden exposure of white birch stems to increased sunlight and heat, which usually occurs after a partial stand disturbance, usually leads to birch mortality. Red maple has greater longevity and shade tolerance, both of which facilitate its persistence into later successional stages. It also flowers before most other spring plants, providing one of the most important early and abundant pollen and nectar sources used by a wide range of insects. Both species, but red maple in particular,are favoured as browse for deer and moose.

Characteristic Plants	IH6		IH6a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
White birch	97	35.1	89	18.6
Red maple	94	29.8	100	36.4
Balsam fir	33	17.3	33	11.7
Red spruce	28	6.0	44	8.8
White pine	28	4.8	11	15.0
Yellow birch	25	9.0	11	5.0
Large-tooth aspen	22	8.9	33	20.0
White spruce	14	6.6	22	6.5
Sugar maple	11	10.5	22	9.0
Red oak	11	8.8	22	7.5
Trembling aspen	11	5.5	67	27.3
Tree Layer (Mean % Cover)		**80**		**94**
Balsam fir	78	5.9	67	7.1
Red maple	69	5.1	56	1.1
Wild raisin	67	1.8	56	1.9
Lambkill	61	16.5	56	2.3
Velvet-leaf blueberry	58	12.9	56	5.7
Striped maple	53	2.4	44	2.9
White pine	50	1.8	44	0.3
Black spruce	44	3.5	56	1.0
Serviceberry	44	0.6	89	0.3
Lowbush blueberry	42	4.8	44	2.3
Red spruce	42	2.7	44	1.6
False holly	36	0.9	11	0.1
Red oak	33	1.3	67	0.2
Witch hazel	28	3.3	44	0.1
Beaked hazelnut	28	0.5	56	9.4
Shrub Layer (Mean % Cover)		**43**		**22**
Wild lily-of-the-valley	89	1.7	100	2.0
Starflower	89	0.9	100	0.7
Bunchberry	81	7.2	78	3.5
Sarsaparilla	78	3.0	89	5.4
Bracken	72	12.1	89	12.6
Ground pine	61	0.7	67	0.1
Goldthread	50	2.9	78	0.8
Partridge-berry	50	0.5	89	3.0
Teaberry	44	17.8	56	6.6
Evergreen wood fern	39	2.2	22	1.5
Wood aster	39	0.7	33	0.5
Painted trillium	39	0.1	33	0.1
Twinflower	36	2.0	11	0.5
Mayflower	36	1.0	33	0.2
Indian cucumber root	36	0.3	56	0.1
Bluebead lily	33	2.0	44	0.2
Hay-scented fern	31	7.4		
Violets	11	6.3	44	1.3
Large-leaved aster	11	0.7	33	0.4
Short husk	11	0.1	56	0.1
Interrupted fern	8	0.7	44	8.3
New York fern	3	35.0	33	20.7
Herb Layer (Mean % Cover)		**38**		**42**
Schreber's moss	86	3.1	89	1.2
Hypnum moss	75	1.7	44	1.1
Broom moss	72	0.7	78	1.0
Hair cap moss	64	0.8	100	1.7
Stair-step moss	39	1.8	44	0.4
Shaggy moss			33	0.5
Bryo-Lichen Layer (Mean % Cover)		**7**		**6**

Distinguishing Features

The canopy of this hardwood forest is dominated by early successional species (red maple, white birch, trembling and large-tooth aspen). Wild raisin, blueberry, lambkill, bracken and sarsaparilla are usually present. Aspen is diagnostic for the variant IH6a.

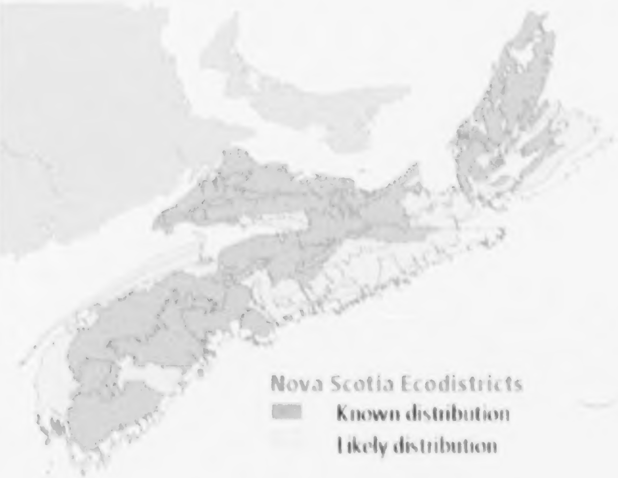
Sarsaparilla

Site Characteristics

Slope Position:	Upper^{5} Middle^{3} Level^{1} Lower^{1}
Surface Stoniness:	(Non - Slightly)^{6} (Moderately)^{3} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	8 - 229m
Slope Gradient:	Gentle^{7} Moderate^{1} Level^{1} nd^{1}
Aspect:	North^{3} East^{1} South^{2} West^{3} None^{1}
Exposure:	Moderate^{8} Mod. exposed^{2}
Microtopography:	Moderately^{6} Slightly^{3} Strongly^{1}
Drainage:	Well^{6} Moderately well^{2} Imperfect^{2}

Soil Characteristics

Soil Type:	ST2^{4} ST2-L^{2} ST6^{1} ST15^{1} Other^{2}
Parent Material:	Glacial till^{9} Till/Bedrock^{1}
Rooting Depth (cm):	(<30)^{1} (30-45)^{3} (>45)^{4} nd^{2}
Duff Thickness (cm):	(0-5)^{3} (6-10)^{4} (11-20)^{1} nd^{2}



Tyndal Road,
Cumberland County

IH7

Red maple / Hay-scented fern – Wood sorrel

Acer rubrum / Dennstaedtia punctilobula
Oxalis acetosella

n=18

Concept: This early to mid successional Vegetation Type (VT) has an overstory dominated by red maple and lesser amounts of several shade-tolerant associates, possibly including sugar maple, yellow birch and/or red spruce. IH7 is also distinguished by its diverse herb layer, which is indicative of mesic Nova Scotia hardwood forests. Red maple / Hay-scented fern – Wood sorrel usually follows stand-replacing disturbances events such as fire, windthrow or clearcutting, but it can also result from partial harvesting within hardwood forests.

Vegetation: Red maple is the dominant overstory tree, accompanied by a lesser amount of sugar maple, yellow birch, red spruce and/or beech. The shrub layer is moderately developed and includes regenerating trees (including balsam fir), fly honeysuckle and striped maple. The herb layer is dominated by several species of ferns, most notably hay-scented fern which can be an aggressive competitor in open, disturbed sites. Other common species include New York fern, evergreen wood fern, rose twisted stalk, Indian cucumber root, wood aster, wood sorrel, bristly and shining club-moss, and various violet species. The bryophyte layer is poorly developed.

Environmental Setting: IH7 is associated with fresh to moist, nutrient medium to rich soils of variable texture. This VT is found scattered throughout Nova Scotia, but is particularly common on upper slope positions within the Nova Scotia Uplands ecoregion. This VT is common in New Brunswick and on Prince Edward Island. It is the most widespread red maple forest in the Maritimes.

Successional Dynamics: IH7 is an early to mid-successional VT that usually follows stand-level disturbance events in hardwood forests. The main disturbance agents are typically windthrow and harvesting, including aggressive partial harvesting, which can promote coppice red maple regeneration. The smothering and competitive nature of hay-scented fern can also restrict and/or delay establishment of other hardwood species. With sufficient time between disturbance events, IH7 can succeed to TH1 (Sugar maple / Hay-scented fern), TH2 (Sugar maple / New York fern – Northern beech fern), TH6 (Red oak – Yellow birch / Striped maple) or MW1 (Red spruce – Yellow birch / Evergreen wood fern).

Ecological Features

This early successional closed canopy hardwood forest typically develops following stand-level disturbance. Regeneration is by seed or coppice. The longevity and relatively high shade tolerance of red maple facilitate its persistence into later successional stages. Red maple regenerates quickly as coppice and is a favoured browse by both deer and moose. It flowers before most other spring plants, providing one of the most important early and abundant pollen and nectar sources used by a wide range of insects. With increased light availability caused by canopy disturbances, hay-scented fern can be very invasive and spread aggressively, which restricts tree regeneration.

Characteristic Plants

	IH7	
	Freq. (%)	Cover (%)
Red maple	100	66.4
Sugar maple	56	17.8
Yellow birch	56	7.3
Red spruce	33	3.8
Beech	33	3.2
White spruce	11	2.0
White ash	11	1.5
Tree Layer (Mean % Cover)		**84**
Balsam fir	89	4.0
Yellow birch	78	2.4
Red maple	78	1.2
Sugar maple	67	5.4
Fly-honeysuckle	56	1.1
Red spruce	44	1.2
Striped maple	39	2.2
Beech	39	0.7
White spruce	33	3.4
Wild raisin	22	0.8
White pine	22	0.3
Beaked hazelnut	22	0.1
Shrub Layer (Mean % Cover)		**15**
Hay-scented fern	94	48.2
Evergreen wood fern	89	6.3
Violets	89	1.2
Wild lily-of-the-valley	72	1.3
Goldthread	67	1.7
Wood sorrel	67	1.6
Starflower	67	0.7
Sarsaparilla	56	1.1
Wood aster	56	0.6
Rose twisted stalk	56	0.5
Indian cucumber root	50	0.3
Bristly club-moss	44	4.4
Ground pine	44	0.7
Partridge berry	44	0.7
Drooping wood sedge	44	0.1
Painted trillium	44	0.1
New York fern	39	9.0
Bluebead lily	39	0.1
Short husk	39	0.1
Christmas fern	33	2.4
Northern beech fern	33	0.9
Bunchberry	28	0.4
Shining club-moss	28	0.4
Dwarf raspberry	28	0.2
Three seeded sedge	28	0.1
Bracken	22	2.5
Cinnamon fern	22	1.0
Blue joint	22	0.1
White lettuce	22	0.1
Wood reed	22	0.1
Herb Layer (Mean % Cover)		**66**
Hypnum moss	67	1.8
Hair cap moss	67	0.2
Broom moss	39	1.8
Stair-step moss	39	1.1
Fern moss	39	0.7
Bazzania	33	0.3
Bryo-Lichen Layer (Mean % Cover)		**3**

Distinguishing Features

This hardwood forest on well drained soils is dominated by red maple. On better sites sugar maple, yellow birch and beech are present. Extensive hay-scented fern cover is diagnostic for this unit. New York fern and evergreen wood fern are also common.

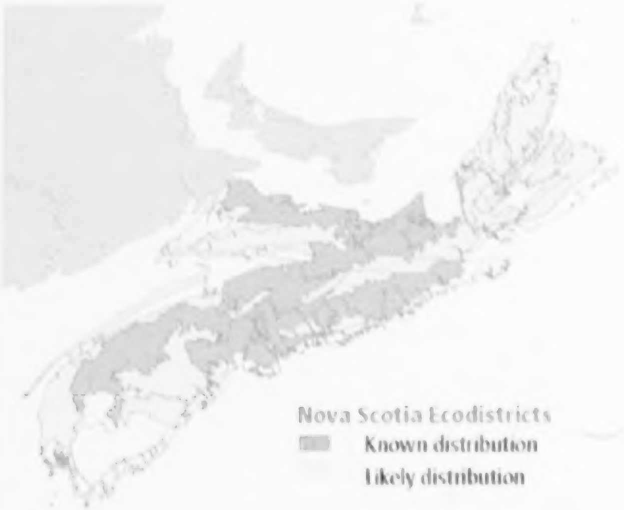
Hay scented fern

Site Characteristics

Slope Position: Middle^{4} Upper^{3} Crest^{2} Level^{1}
Surface Stoniness: (Non - Slightly)^{7} (Moderately)^{1} (Very - Excessively)^{1} nd^{1}
Bedrock Outcrop: (Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range: 28 - 261m
Slope Gradient: Gentle^{4} Moderate^{4} Level^{1} Steep^{1}
Aspect: North^{4} East^{2} South^{1} West^{1} None^{1} nd^{1}
Exposure: Moderate^{5} Mod. exposed^{4} Mod. sheltered^{1}
Microtopography: Moderately^{4} Strongly^{4} Other^{2}
Drainage: Moderately well^{5} Well^{5}

Soil Characteristics

Soil Type: ST2-L^{4} ST5^{2} ST2^{1} ST8^{1} Other^{2}
Parent Material: Glacial till^{10}
Rooting Depth (cm): (30-45)^{4} (>45)^{6}
Duff Thickness (cm): (0-5)^{2} (6-10)^{5} (11-20)^{1} (>40)^{1} nd^{1}



KA

Karst Forest Group

(n = 8)

KA1 Hemlock / Christmas fern – White lettuce – Wood goldenrod

KA2 Sugar maple / Christmas fern – Rattlesnake fern – Bulbet bladder fern

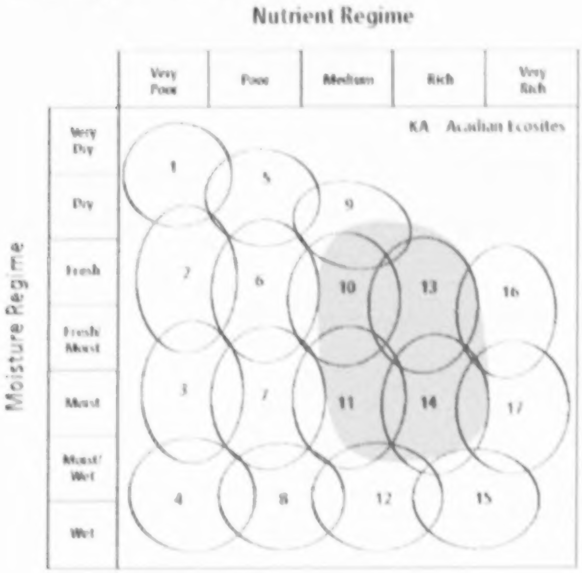
Concept: This group is distinguished by its unique karst topography and scattered presence of vascular plants associated with karst habitat. Exposure of gypsum/limestone bedrock is needed to assign Vegetation Types (VT) to this group. Sites where karst influences are minimized by thick glacial till deposits (i.e. sites with sinkholes but no exposed bedrock) are not included. Only two broadly described VTs are currently recognized, a mature softwood/mixedwood unit and a mature hardwood unit. Early and mid-successional forest (red maple, white birch, aspen, white spruce) are known and fact sheets for these units will be developed as more data are collected. Vegetation types in this group are found only in the Acadian Ecosite group.

Vegetation: Vegetation types are closed canopy forests usually dominated by hemlock and red spruce (softwood/mixedwood unit) or sugar maple (hardwood unit), but other species are possible. The shrub layer often includes striped maple and round-leaf dogwood, with Christmas fern, wood goldenrod and white baneberry found in the herb layer. Several rare plants including yellow lady slipper, ram's head lady slipper and bulbet bladder fern are associated with this group, but are not necessarily found in every stand.

Environmental Setting: In Nova Scotia karst topography is usually associated with gypsum sites, but similar landforms have been observed over limestone and dolomite. Groundwater dissolves these soluble bedrock types producing a highly irregular surface relief called karst or "egg carton" topography containing sinkholes. Bedrock exposures are common, but surface stoniness is normally low. Most sites range from fresh to moist with medium to rich fertility. Vegetation types form small to medium size patches on the landscape. This group is found in the Northumberland Bras d'Or Lowlands (500) and Valley Central Lowlands (600) ecoregions, and in the Victoria Lowlands (220), Cape Breton Hills (310) and Inverness Lowlands (320) ecodistricts (with scattered occurrences in the Pictou Antigonish Highlands (330) ecodistrict).

Successional Dynamics: This group is associated with mid to late successional zonal VTs. Depending on site conditions and disturbance history, eventual climax forests are either softwood, mixedwood, or hardwood VTs dominated by hemlock, red spruce, balsam fir, white pine, sugar maple, yellow birch, red maple, white ash, red oak and/or beech. In the absence of harvesting, late successional stages will develop an uneven-aged structure between infrequent stand-level disturbance events. Natural disturbance agents include hurricanes (windthrow), fire, insects and subsidence.

Edatopic Grid



Ecological Features

In Nova Scotia, karst occurs over soluble bedrock types such as gypsum, limestone and dolomite. Karst landscapes are rugged and irregular with diverse surface expressions including cliffs, caves, fissures, talus, pinnacles and steep sided depressions called sinkholes. Temperate gypsum karst forests are rare in Canada and the majority of occurrences are concentrated in Nova Scotia. This presents unique conservation challenges, many of which are strongly exacerbated by gypsum mining pressures. Rare plant species (e.g. bulblet bladder fern, ram's-head lady's-slipper, shepherdia, hyssop-leaved fleabane, leatherwood and yellow lady's slipper, among other species) most commonly associated with karst are not frequent in plot data because many are only sparsely scattered across karst landscapes, and are generally more common on open cliffs and talus slopes. Karst caves provide some of the province's most important bat hibernacula. This group has good potential to support old growth composed of a variety of climax species, however stand dynamics are not well understood.

Brooklyn,
Hants County

KA1

Hemlock / Christmas fern – White lettuce – Wood goldenrod

Tsuga canadensis / Polystichum acrostichoides – Prenanthes altissima – Solidago flexicaulis

n=3

Concept: The late successional Hemlock / Christmas fern – White lettuce – Wood goldenrod forest is characterized by its canopy composition and unique karst site conditions. The overstory is dominated by hemlock and a variety of hardwoods including red maple, large-tooth aspen and red oak. Similar to other forests dominated by hemlock—our longest living and most shade-tolerant conifer—this Vegetation Type (VT) will develop old forest characteristics, maintained by gap disturbances.

Vegetation: The canopy is characterized by intermediate to high levels of hemlock. Red maple, large-tooth aspen and red oak are common deciduous components of stand structure, while white pine and balsam fir may be important co-dominants in some stands. Understory layers are usually sparse and species-poor, although several species show high frequency (e.g. striped maple, white lettuce, Christmas fern, wood goldenrod, drooping wood sedge, among others). Bryophyte cover is reduced. Plant species locally associated with karst are not frequent in plot data because many of these species are sparsely scattered across karst landscapes, and are generally more common on open cliffs and talus slopes. On deeper soils, where alkaline bedrock is further from the rooting zone, nutrient enrichment is weakened, further limiting the prominence of karst plants. The KA1 ecosystem has fewer karst plants than KA2 (a deciduous karst forest) because in KA1 the forest floor is heavily shaded.

Environmental Setting: KA1 occurs on fresh to moist and nutrient medium to rich soils. This ecosystem is only found on karst topography, a rugged landform with scattered bedrock exposures and steep sided sinkholes. This VT is mainly found in the Central Lowlands and Bras d'Or Lowlands ecodistricts. Microtopography is usually weakly expressed due to the shallow surficial deposits which limit rooting potential. This VT occurs in southern New Brunswick but is very uncommon. It is absent from Prince Edward Island.

Successional Dynamics: Depending on disturbance history, this late successional VT can be even-aged, but will develop an uneven-aged structure as it matures. Disturbance agents include wind, insects/disease, harvesting and karst forming processes (e.g. bedrock dissolution, soil subsidence and sinkhole formation). These processes can open relatively large canopy gaps and expose mineral soil, promoting shade-intolerant hardwoods.

Ecological Features

This VT occurs as a small to large patch in areas where glacial tills are underlain by calcareous bedrock. This uncommon closed canopy community supports many rare plants, including yellow and ram's head lady's slippers and leatherwood. Ram's head lady's slipper is legally protected and listed as endangered under the Nova Scotia Endangered Species Act. Most karst in Nova Scotia develops over gypsum deposits forming rugged landforms with funnel shaped sinkholes, subterranean caves and tunnels. Caves may be used by porcupine, creating unique cave faunal communities associated with porcupine dung. Larger caves, some up to several hundred meters deep, may also provide important winter hibernacula for bats. Karst landscapes contain a diverse mix of habitats ranging from dry hill crests and actively collapsing sinkholes to small alkaline ponds and wetlands. Their calcareous soils support the greatest diversity of land snails in the Province. Gypsum and limestone quarrying, which are common in areas of Nova Scotia karst, has detrimental impacts on biodiversity.

Characteristic Plants

	KA1	
	Freq (%)	Cover (%)
Hemlock	100	22.0
Red maple	100	16.0
Large tooth aspen	100	12.0
Red oak	100	10.0
White pine	100	6.0
Beech	100	2.1
Balsam fir	67	28.0
Sugar maple	67	12.0
Yellow birch	67	0.1
Tree Layer (Mean % Cover)		**88**
Hemlock	100	2.5
Balsam fir	100	0.6
Large tooth aspen	100	0.1
Beech	67	0.5
Red spruce	67	0.1
Striped maple	67	0.1
White pine	67	0.1
Witch hazel	67	0.1
Shrub Layer (Mean % Cover)		**4**
Christmas fern	100	1.5
Common speedwell	100	0.5
Evergreen wood fern	100	0.3
Bluebead lily	100	0.1
New York fern	100	0.1
White lettuce	100	0.1
Allegheny hawkweed	67	4.0
Hawkweeds	67	3.0
Lady fern	67	1.5
Bracken	67	1.0
Large leaved aster	67	1.0
Tall buttercup	67	1.0
Drooping wood sedge	67	0.1
Eastern spreading wood fern	67	0.1
Fibrous root sedge	67	0.1
Goldenrods	67	0.1
Helliborine	67	0.1
Ram's head lady's slipper	67	0.1
Rough goldenrod	67	0.1
Wood goldenrod	67	0.1
Yellow green sedge	67	0.1
Herb Layer (Mean % Cover)		**9**
Broom moss	100	0.5
Hypnum moss	100	0.1
Stair step moss	67	0.1
Bryo-Lichen Layer (Mean % Cover)		**1**

Distinguishing Features

This is a broadly defined softwood forest occurring on karst topography. Hemlock is usually the dominant overstory species, but depending on past disturbances and successional stage other species such as balsam fir, spruce, red maple, aspen, birch and red oak may be present.

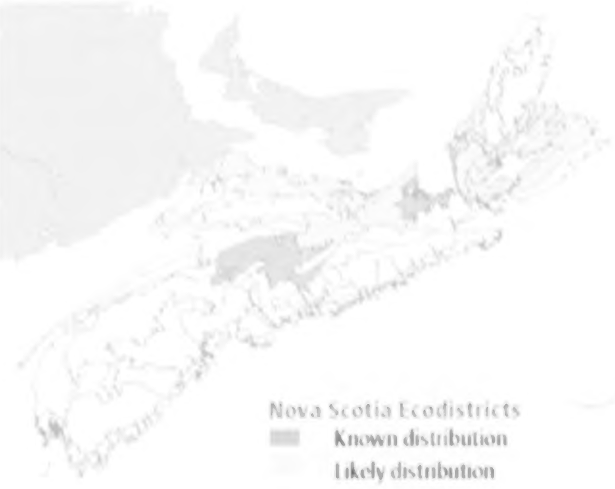
Wood goldenrod

Site Characteristics

Slope Position:	Level^{33} Lower^{33} Middle^{33}
Surface Stoniness:	(Non - Slightly)^{100}
Bedrock Outcrop:	(Non rocky)^{67} (Slightly - Moderately)^{33}
Elevation Range:	13 - 41m
Slope Gradient:	Gentle^{33} Level^{33} Steep^{33}
Aspect:	North^{33} South^{33} None^{33}
Exposure:	Moderate^{33} Mod. Exposed^{33} Sheltered^{33}
Microtopography:	Level^{67} Strongly^{33}
Drainage:	Well^{100}

Soil Characteristics

Soil Type:	ST2-L^{33} ST8^{33} nd^{33}
Parent Material:	Glacial till^{100}
Rooting Depth (cm):	(>45)^{67} nd^{33}
Duff Thickness (cm):	(0-5)^{67} nd^{33}



Nova Scotia Ecodistricts
▨ Known distribution
▨ Likely distribution

*Brookfield,
Colchester County*

KA2

Sugar maple / Christmas fern – Rattlesnake fern – Bulblet bladder fern

Acer saccharum / Polystichum acrostichoides – Botrychium virginianum – Cystopteris bulbifera

n=5

Concept: The Sugar maple / Christmas fern – Rattlesnake fern – Bulblet bladder fern forest is distinguished from other provincial forests by its unique site conditions, overstory composition, and by the presence of understory plants locally associated with karst topography. This late successional Vegetation Type (VT) has an overstory dominated by sugar maple with lesser yellow birch, beech and white ash. These long lived and shade tolerant trees will develop old forest characteristics, maintained by gap disturbances.

Vegetation: The canopy supports moderate to high crown closure and is usually dominated by sugar maple. Beech, yellow birch /or white birch can be locally abundant, while white ash and balsam fir are somewhat frequent but occur with reduced cover. The understory supports low to moderate levels of woody and bryophyte species but higher herbaceous cover. Characteristic plants include striped maple, round-leaved dogwood, oak fern, Christmas fern, white baneberry and marginal wood fern. Plant species commonly associated with karst are not frequent in plot data because most of these species are sparse across broader karst landscapes, particularly where soils are deeper and nutrient enrichment is weakened.

Environmental Setting: KA2 is associated with fresh to moist, nutrient medium to rich soils found in karst landscapes. These landscapes are typically rugged with scattered bedrock exposures and steep sided sinkholes. This VT is mainly found in the Central Lowlands and Bras d'Or Lowlands ecodistricts. KA2 occurs at low elevation on karst flats, short slopes and shallow depressions; microtopography is moderate. Rooting potential can be strongly limited by shallow surficial deposits. This VT occurs in southern New Brunswick but is very uncommon. It is absent from Prince Edward Island.

Successional Dynamics: KA2 is a late successional, uneven-aged VT dominated by sugar maple. Excluding harvesting, stand-level disturbance events are rare with gaps or small patches usually created by individual tree mortality, wind, ice damage or karst processes. Bedrock dissolution, sinkhole formation and soil erosion, and subsidence are common ecosystem processes in karst landscapes. Where stand-level disturbances have occurred, potential early successional VTs include IH4 (Trembling aspen / Wild raisin / Bunchberry) and IH5 (White birch – Red maple / Sarsaparilla – Bracken). In areas where deeper till deposits occur over calcium-enriched bedrock, TH8 (Red maple – Yellow birch / Striped maple) may be found in conjunction with KA2 stands.

Ecological Features

This VT occurs as a small to large patch in areas where glacial tills are underlain by calcareous bedrock. This uncommon closed canopy community supports many rare plants, including yellow and ram's head lady's slippers and leatherwood. Most Nova Scotia karst develops over gypsum deposits forming rugged landforms with funnel shaped sinkholes, subterranean caves and tunnels. Caves may be used by porcupine, creating unique cave faunal communities associated with porcupine dung. Larger caves, some up to several hundred meters deep, may also provide important winter hibernacula for bats. Karst landscapes contain a diverse mix of habitats ranging from dry hill crests and actively collapsing sinkholes to small alkaline ponds and wetlands. Their calcareous soils support the greatest diversity of land snails in the Province. Gypsum and limestone quarrying, which are common in areas of Nova Scotia karst, has detrimental impacts on biodiversity.

Characteristic Plants	KA2	
	Freq (%)	Cover (%)
Sugar maple	100	46.0
Yellow birch	100	12.6
White ash	60	13.7
Balsam fir	60	10.0
White birch	40	18.0
Beech	40	17.5
Hemlock	40	5.0
Ironwood	40	5.0
Red maple	20	15.0
Striped maple	20	5.0
Tree Layer (Mean % Cover)		**92**
Balsam fir	100	1.7
Sugar maple	80	17.5
Striped maple	80	4.5
White spruce	80	2.0
White ash	60	1.7
Hemlock	60	1.0
Fly honeysuckle	60	0.9
Yellow birch	60	0.7
Mountain maple	60	0.3
Red berried elder	60	0.1
Beech	40	3.6
Alternate leaved dogwood	40	0.2
Serviceberry	40	0.1
Shrub Layer (Mean % Cover)		**28**
Oak fern	100	15.9
Christmas fern	100	12.7
Violets	100	8.2
Wild lily of the valley	100	4.6
Evergreen wood fern	100	3.0
Northern beech fern	100	1.4
Drooping wood sedge	80	0.2
Indian cucumber root	80	0.1
White baneberry	80	0.1
Hay scented fern	60	9.0
Wood sorrel	60	1.8
Marginal wood fern	60	1.7
Lady fern	60	0.8
Sarsaparilla	60	0.7
Common speedwell	60	0.4
Rattlesnake fern	60	0.2
Sweet-scented bedstraw	60	0.2
False Solomon's seal	60	0.1
Shinleaf	60	0.1
Wood reed	60	0.1
Bulbet bladder fern	40	3.0
New York fern	40	2.5
Small enchanter's nightshade	40	0.4
Wood goldenrod	40	0.4
Partridge berry	40	0.3
Ribless woodland sedge	40	0.2
Herb Layer (Mean % Cover)		**62**
Schreber's moss	80	0.9
Hair-cap moss	80	0.3
Stair-step moss	80	0.1
Fern moss	60	9.8
Shaggy moss	60	2.2
Brachythecium moss	60	1.7
Bryo-Lichen Layer (Mean % Cover)		**10**

Distinguishing Features

This is a broadly defined hardwood forest occurring on karst topography. Sugar maple is usually the dominant overstory species, but depending on past disturbances and successional stage other species such as yellow birch, beech, white ash, white birch and red maple may be present.

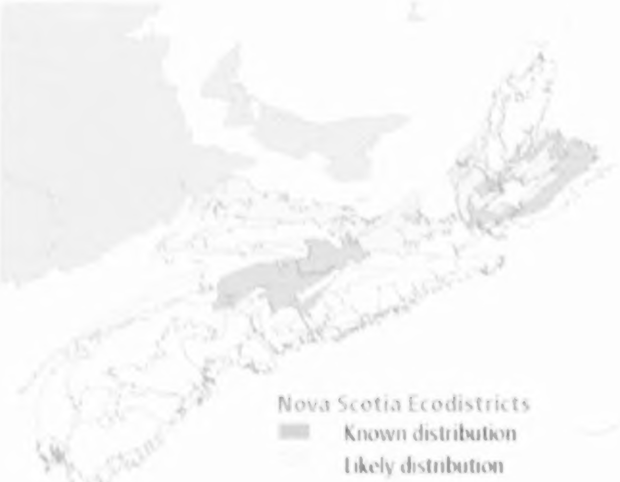
Gypsum cliff, Mabou Harbour

Site Characteristics

Slope Position:	Upper^{4} Crest^{2} Lower^{2} Middle^{2}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non rocky)^{4} (Slightly - Moderately)^{4} (Very - Excessively)^{2}
Elevation Range:	13 - 80m
Slope Gradient:	Moderate^{4} Steep^{4} nd^{2}
Aspect:	North^{4} South^{2} West^{2} None^{2}
Exposure:	Moderate^{8} Sheltered^{2}
Microtopography:	Moderately^{8} Slightly^{2}
Drainage:	Moderately well^{4} Well^{4} Imperfect^{2}

Soil Characteristics

Soil Type:	ST11^{4} ST5^{2} ST12^{2} ST15-L^{2}
Parent Material:	Glacial till^{8} Colluvium^{2}
Rooting Depth (cm):	(<30)^{2} (30-45)^{2} (>45)^{4} nd^{2}
Duff Thickness (cm):	(0-5)^{6} (6-10)^{2} nd^{2}



Nova Scotia Ecodistricts

■ Known distribution

▨ Likely distribution

MW Mixedwood Forest Group

(n = 100)

MW1 Red spruce – Yellow birch / Evergreen wood fern
MW2 Red spruce – Red maple – White birch / Goldthread …… **MW2a** Aspen variant
MW3 Hemlock – Yellow birch / Evergreen wood fern
MW4 Balsam fir – Red maple / Wood sorrel – Goldthread
MW5 White birch – Balsam fir / Starflower

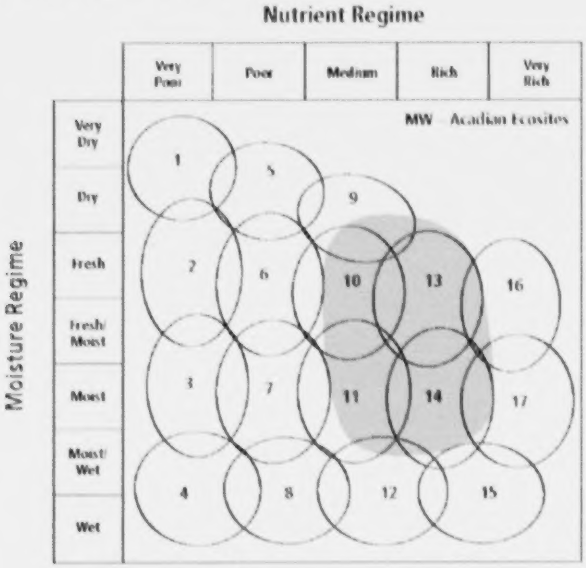
Concept: This group represents early to late successional mixedwood Vegetation Type (VT) found on zonal sites within the Acadian Ecosite groups. Vegetation types can be difficult to categorize at times due to variation in tree species mix and abundance. Earlier successional stages are dominated by red maple, white birch and balsam fir, but they usually contain residuals from past stand-level disturbances. Late successional stages contain yellow birch along with red spruce or hemlock. Herb and bryophyte diversity is high and coverage can be extensive, especially in the yellow birch mixedwoods. Early and mid successional stages are usually even-aged whereas late successional stages can develop uneven-aged characteristics due to the longevity of dominant species.

Vegetation: Vegetation types are closed canopy forests with a range of species depending on disturbance history. Earlier successional stages are dominated by red maple, white birch, aspen and balsam fir; while later stages have red spruce, hemlock, yellow birch and sugar maple as dominants. The shrub layer consists mainly of regenerating trees and the herb layer is comprised of typical woodland species. The presence of several fern species is not unusual. The extent of bryophyte cover depends on the abundance of hardwood species and the related loss of spore germination sites due to leaf litter.

Environmental Setting: Vegetation types in this group are found on a range of slope positions. Most sites are non-rocky, but surface stoniness can be variable. Soils are mainly derived from glacial till deposits. A wide range of moisture levels can be found, but fertility is generally medium to rich throughout. Various VTs form the matrix forest or large patches in many ecodistricts. This group is found throughout the province except in the Cape Breton Taiga (100) and Atlantic Coastal (800) ecoregions.

Successional Dynamics: This group is associated with early to late successional zonal VTs. Depending on site conditions and disturbance history, eventual climax forests are either mixedwood or softwood VTs dominated by red spruce, hemlock, yellow birch, sugar maple and beech. Mid-successional stages usually have a significant component of red maple, white birch and/or balsam fir in the overstory and are typically even-aged. Late successional stages dominated by shade-tolerant species will develop an uneven-aged structure between infrequent stand-level disturbance events. Disturbance agents include hurricanes (windthrow), fire, insects and harvesting.

Edatopic Grid



Ecological Features

Mixedwood forests embody features of both coniferous and deciduous ecosystems, composed of either shade-tolerant or intolerant canopy species, depending on the mechanism of stand origin. These large patch to matrix forests have complex canopy structures including softwood or hardwood inclusions or, more commonly, a blend of both growth forms. Understory plant composition tends to be shaped by overstory structure and soil attributes. Bryophytes are more abundant under softwood canopy components, while deciduous trees promote shrub and herb cover. Mixedwood forests are used by numerous wildlife species, including those associated with both hardwood and softwood forest. Few fauna are exclusive to mixedwood forests but some recur frequently, especially in mature stands. The best known mixedwood associates are birds (e.g. sharp-shinned hawk, northern goshawk, veery, solitary vireo, black-throated blue warbler, black and white warbler, American redstart and ovenbird). The potential for old growth and rare plants is variable, depending on successional stage and site conditions.

Sheepherders Junction, Colchester County

MW1

Red spruce – Yellow birch / Evergreen wood fern

Picea rubens – Betula alleghaniensis / Dryopteris intermedia

n=30

Concept: This late successional mixedwood Vegetation Type (VT) has an overstory co-dominated by red spruce and yellow birch, with lesser amounts of mostly shade tolerant trees. It is similar to MW3 (Hemlock – Yellow birch / Evergreen wood fern), but with greater red spruce prominence. In eastern Nova Scotia, balsam fir can take the place of red spruce in this VT (e.g. St. George's ecodistrict). The longevity and shade tolerance of the dominant overstory tree species aids in the development of old forest characteristics, maintained by gap disturbances.

Vegetation: Red spruce and yellow birch are the dominant overstory trees. A suite of other shade tolerant trees (e.g. sugar maple, hemlock, beech, balsam fir, red maple, white pine and white ash) may also be present to varying degrees. The shrub layer is moderately developed and includes mainly regenerating trees, striped maple and fly honeysuckle. Several fern species are common in the well-developed herb layer including evergreen wood fern, New York fern and hay scented fern. Wood sorrel, wood aster, rose twisted stalk, Indian cucumber root and some club-mosses are also common. Herb layer species can be used to assess relative site conditions, with hay scented fern usually found on drier, poorer sites, and Christmas fern, northern beech fern and shining club-moss found on moister, richer sites. Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstory. Schreber's moss and stair-step moss are the main species. Bazzania can also be common where coarse woody debris has accumulated on the forest floor.

Environmental Setting: MW1 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of variable texture. This VT can be found throughout mainland Nova Scotia, but is most common in central and eastern sections of the province and along the Bay of Fundy shore. Coarse woody debris coverage can be quite variable on MW1 sites due to the short lifespan of balsam fir which is always a significant component of this VT. Red spruce – Yellow birch / Evergreen wood fern is a climax Acadian mixedwood VT found on zonal sites throughout mainland Nova Scotia. This VT is also found throughout New Brunswick, but is absent from Prince Edward Island.

Successional Dynamics: MW1 is a late successional climatic climax VT dominated by red spruce and yellow birch. It can develop from several early and mid-successional VTs including SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum), SH8 (Balsam fir / Wood fern / Schreber's moss) and MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread). Early successional stages can be by-passed if, at the time of disturbance, advanced red spruce and yellow birch regeneration is present and retained. Depending on disturbance history, this VT can be even aged, but it will develop an uneven-aged structure as it matures. Between large-scale disturbance events, this VT will maintain itself through gap replacement or possibly transition to MW3 (Hemlock – Yellow birch / Evergreen wood fern).

Ecological Features

This closed canopy forest is matrix forming in central Nova Scotia and a large patch forest elsewhere. The shade tolerance and longevity of red spruce and yellow birch promotes development of uneven-aged canopy structures and old growth. Large trees can provide nest sites for pileated woodpeckers, barred owls, red-tailed hawks and northern goshawks. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Mixedwood forests can also provide both shelter and food for overwintering deer. Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals. Birch trees in these forests may be deformed, and eventually killed, by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.

Characteristic Plants

	MW1	
	Freq. (%)	Cover (%)
Red spruce	100	38.2
Yellow birch	100	20.9
Red maple	73	13.5
Sugar maple	43	6.2
Balsam fir	40	6.8
Beech	30	4.2
Hemlock	20	9.3
White birch	20	2.5
White ash	13	4.5
White pine	10	4.3
Tree Layer (Mean % Cover)		**79**
Balsam fir	87	7.9
Red spruce	87	3.5
Yellow birch	87	0.7
Red maple	73	1.5
Striped maple	70	4.5
Sugar maple	60	1.3
Beech	57	2.4
Fly-honeysuckle	50	0.7
White pine	27	0.4
Hemlock	20	1.8
Velvet-leaf blueberry	20	0.7
Red oak	20	0.1
Shrub Layer (Mean % Cover)		**19**
Wild lily-of-the-valley	90	2.9
Starflower	90	0.6
Evergreen wood fern	77	6.1
Wood sorrel	63	6.4
Sarsaparilla	63	1.7
New York fern	60	6.3
Bunchberry	60	3.5
Goldthread	60	3.0
Partridge-berry	57	0.2
Hay-scented fern	53	9.9
Rose twisted stalk	43	0.2
Shining club-moss	40	1.6
Ground pine	40	0.6
Bluebead lily	40	0.5
Wood aster	40	0.3
Indian cucumber root	40	0.1
Painted trillium	33	0.1
Twinflower	30	2.3
Violets	30	0.3
Indian pipe	30	0.1
Christmas fern	27	0.2
Northern beech fern	27	0.2
Eastern spreading wood fern	20	2.6
Pink lady's slipper	20	0.1
Herb Layer (Mean % Cover)		**30**
Bazzania	90	3.9
Broom moss	83	1.7
Stair-step moss	77	13.4
Schreber's moss	77	5.2
Hypnum moss	77	1.9
Hair-cap moss	47	0.6
Fern moss	37	0.9
Wavy dicranum	33	1.3
Bryo-Lichen Layer (Mean % Cover)		**22**

Distinguishing Features

Yellow birch and red spruce dominate these mixedwood forests that occur on well drained soils. In eastern Nova Scotia the red spruce is often replaced by balsam fir. An assortment of ferns, notably evergreen wood fern, New York fern and hay-scented fern dominate the herb layer.

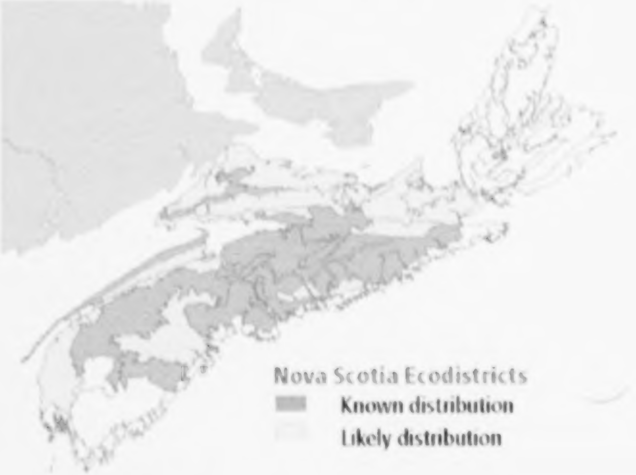
Evergreen wood fern

Site Characteristics

Slope Position:	Middle^{4} Upper^{3} Lower^{2} Level^{1}
Surface Stoniness:	(Non - Slightly)^{4} (Moderately)^{4} (Very - Excessively)^{2}
Bedrock Outcrop:	(Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	54 - 246m
Slope Gradient:	Gentle^{7} Moderate^{2} Level^{1}
Aspect:	North^{1} East^{3} South^{3} West^{2} None^{1}
Exposure:	Moderate^{6} Mod. exposed^{3} Mod. sheltered^{1}
Microtopography:	Moderately^{4} Slightly^{5} Strongly^{1}
Drainage:	Well^{5} Moderately well^{4} Imperfect^{1}

Soil Characteristics

Soil Type:	ST2^{5} ST2-L^{1} ST2-G^{1} ST3-L^{1} ST16^{1} Other^{1}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^{1} (30-45)^{5} (>45)^{4}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{7} (11-20)^{2}



Tidney River
Wilderness Area,
Queens County

MW2

Red spruce – Red maple – White birch / Goldthread

Picea rubens – Acer rubrum – Betula papyrifera / Coptis trifolia

MW2a

Aspen variant

Populus grandidentata – Populus tremuloides

n=20

Concept: This mid-successional mixedwood Vegetation Type (VT) has an overstory co-dominated by red spruce and red maple, accompanied by lesser amounts of various other trees. There is one variant (MW2a) where aspen (trembling and/or large-tooth) co-dominates with spruce and maple. MW2 usually occurs as a result of partial harvesting or windthrow. It is a common mixedwood VT found throughout mainland Nova Scotia.

Vegetation: Red spruce and red maple are the dominant overstory trees, with either trembling or large-tooth aspen co-dominant in variant MW2a. Several shade-tolerant trees (e.g. sugar maple, beech, white pine, hemlock) are typical but lesser overstory species. The shrub layer is moderately developed and includes mainly regenerating trees, striped maple and fly-honeysuckle. The herb layer is represented by typical mixedwood forest flora, however species normally associated with poorer sites (e.g. bracken, bunchberry and goldthread) are more common in MW2 than they are in yellow birch mixedwood VTs (MW1 and MW3). Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstory. Schreber's moss and stair-step moss are the main species. Bazzania can also be common where coarse woody debris has accumulated on the forest floor.

Environmental Setting: MW2 is mainly associated with fresh to fresh-moist, nutrient medium soils of variable texture. This VT occurs on mainland Nova Scotia wherever red spruce forests are found. It is common throughout New Brunswick but rare on Prince Edward Island.

Successional Dynamics: MW2 is a mid-successional VT that follows partial stand disturbances such as windthrow and harvesting. Earlier successional VTs may include IH4 (Trembling aspen / Wild raisin / Bunchberry) and IH6 (White birch – Red maple / Sarsaparilla – Bracken). Later successional VTs include SH3 (Red spruce – Hemlock / Wild lily-of-the-valley), MW1 (Red spruce – Yellow birch / Evergreen wood fern) and MW3 (Hemlock – Yellow birch / Evergreen wood fern). Early successional stages can be by-passed if, at the time of disturbance, advanced red spruce regeneration is present and maintained. Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged structure as it matures. Residual trees in the overstory can provide evidence of pre-disturbance conditions and should be considered when assessing possible successional trends.

Ecological Features

This closed canopy forest typically occurs as large patches following stand or patch-scale disturbances such as clearcutting or partial harvesting. Red maple regeneration is by seed or coppice. This ecosystem provides several ecological functions including the facilitation of nutrient cycling, rapid site revegetation after disturbance, and the establishment of nurse crops for later successional species such as red spruce, hemlock and yellow birch. Residual trees from early successional stages are common and may provide notable wildlife habitat values and increased forest structural complexity. Large trees can provide nest sites for pileated woodpeckers, barred owls and northern goshawks. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Mixedwood forests may also provide both shelter and food for overwintering deer.

Characteristic Plants

	MW2		MW2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red spruce	100	32.1	100	34.0
Red maple	100	24.0	80	16.5
Balsam fir	67	10.1	40	15.0
White birch	53	12.1	40	7.5
Yellow birch	47	9.3	20	0.1
Black spruce	20	12.7		
Sugar maple	20	3.3		
Hemlock	13	6.0	20	12.0
Beech	13	5.0	20	0.1
White pine	13	4.0	40	2.5
Large tooth aspen	7	15.0	80	33.5
Trembling aspen	7	10.0	40	14.0
Red oak	7	8.0	40	2.5
Tree Layer (Mean % Cover)		**81**		**93**
Balsam fir	100	11.8	100	5.7
Red spruce	87	4.0	60	4.4
Red maple	67	1.4	100	1.1
Yellow birch	47	1.3	20	0.1
Striped maple	47	0.4	60	2.5
Wild raisin	47	0.1	40	0.1
White pine	40	0.4	60	0.2
Fly honeysuckle	40	0.1	40	0.1
Beech	33	1.7	40	0.1
Lowbush blueberry	33	1.0		
False holly	33	0.2		
Lambkill	27	2.3	20	2.0
Velvet-leaf blueberry	27	0.6	60	0.7
Sugar maple	13	1.0	20	0.1
Hemlock	13	0.5	40	0.1
Serviceberry	13	0.3	80	0.1
Red oak	7	0.1	60	0.2
Shrub Layer (Mean % Cover)		**20**		**13**
Starflower	100	1.7	80	1.1
Wild lily of the valley	87	1.3	100	0.5
Goldthread	73	3.2	20	1.0
Bracken	60	5.1	60	3.3
Sarsaparilla	60	3.2	60	0.7
Painted trillium	60	0.1	60	0.1
Bunchberry	53	3.4	40	5.0
Evergreen wood fern	53	2.6	40	0.1
Partridge berry	53	0.1	20	0.1
Hay scented fern	47	5.9	20	0.1
New York fern	40	14.8	40	0.1
Cinnamon fern	40	2.9		
Twinflower	40	0.7	20	1.5
Bluebead lily	40	0.3	60	0.1
Indian cucumber root	40	0.1	40	0.1
Pink lady's slipper	40	0.1	40	0.1
Wood aster	33	0.1	40	0.3
Wood sorrel	27	7.6	20	2.0
Herb Layer (Mean % Cover)		**28**		**8**
Bazzania	93	5.3	80	2.9
Schreber's moss	87	8.0	80	1.3
Hypnum moss	87	2.5	80	1.4
Broom moss	87	1.9	100	0.4
Stair-step moss	67	8.3	60	0.8
Hair cap moss	47	0.3	80	0.3
Wavy dicranum	40	2.3	20	0.3
Bryo-Lichen Layer (Mean % Cover)		**23**		**6**

Distinguishing Features

Goldthread [John Gillis]

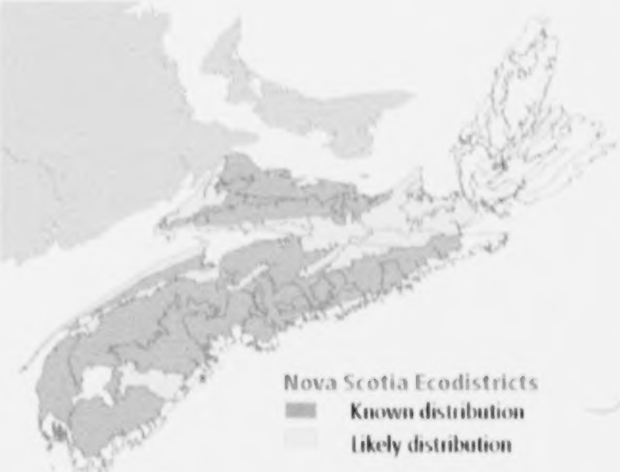
Red spruce and early successional species such as red maple, white birch and aspen occur in this mixedwood forest on well drained soils. For the variant MW2a, aspen replaces much of the red maple. Bracken fern, bunchberry and goldthread are common.

Site Characteristics

Slope Position:	Crest^{2} Lower^{2} Middle^{2} Upper^{2} Other^{1} nd^{1}
Surface Stoniness:	(Non - Slightly)^{5} (Moderately)^{3} (Very - Excessively)^{2}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	24 - 211m
Slope Gradient:	Gentle^{6} Level^{2} Other^{1} nd^{1}
Aspect:	North^{3} East^{1} South^{1} West^{3} None^{1} nd^{1}
Exposure:	Moderate^{8} Mod. exposed^{1} Mod. sheltered^{1}
Microtopography:	Moderately^{4} Slightly^{2} Strongly^{2} Level^{1} nd^{1}
Drainage:	Moderately well^{5} Imperfect^{2} Well^{2} nd^{1}

Soil Characteristics

Soil Type:	ST2^{3} ST3-L^{2} ST6^{2} ST2-G^{1} ST3^{1} Other^{1}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^{3} (30-45)^{3} (>45)^{4}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{5} (11-20)^{3} nd^{1}



Durham,
Pictou County

MW3

Hemlock – Yellow birch / Evergreen wood fern

Tsuga canadensis – Betula alleghaniensis / Dryopteris intermedia

n=34

Concept: This late successional mixedwood Vegetation Type (VT) has an overstory co-dominated by hemlock and yellow birch. Various other trees, including many shade-tolerant species, may be lesser associates. This VT is similar to **MW1** (Red spruce – Yellow birch / Evergreen wood fern), but has greater hemlock prominence. The longevity and shade tolerance of the dominant overstory tree species aids in the development of old forest characteristics, maintained by gap disturbances. Hemlock – Yellow birch / Evergreen wood fern is a climax Acadian mixedwood VT found on zonal sites.

Vegetation: Hemlock is the dominant overstory tree, co-occurring with yellow birch and/or red maple. A suite of other shade-tolerant trees (e.g. sugar maple, beech, balsam fir, white pine and white ash) may also be present to varying degrees. The shrub layer is moderately developed and includes mainly regenerating trees, striped maple and fly honeysuckle. The herb layer is represented by typical mixedwood forest flora. Ferns, club-mosses, and various flowering perennials such as bluebead lily, wild lily of the valley, starflower, Indian cucumber root, partridge berry and wood aster are common. Poorer sites can support pink lady's slipper, teaberry and bracken, while richer sites are represented by Christmas fern, oak fern and northern beech fern. Sites with higher moisture may support cinnamon fern and creeping snowberry, while drier sites may contain increased hay-scented fern. Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstory. Schreber's moss and stair-step moss are the main bryophyte species. Bazzania can also be common where coarse woody debris has accumulated on the forest floor.

Environmental Setting: **MW3** is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of variable texture. Coarse woody debris coverage can be quite variable on **MW3** sites due to the short lifespan of balsam fir which is always a significant component of this VT. This VT can be found throughout mainland Nova Scotia, with scattered occurrences in Cape Breton. This ecosystem occurs on Prince Edward Island and in parts of southern and central New Brunswick, but it is relatively rare in both jurisdictions.

Successional Dynamics: **MW3** is a late successional climatic climax VT co-dominated by hemlock with lesser yellow birch and/or red maple. It can develop from several early and mid-successional VTs including **SH5** (Red spruce – Balsam fir / Schreber's moss), **SH6** (Red spruce – Balsam fir / Stair-step moss – Sphagnum), **SH8** (Balsam fir / Wood fern / Schreber's moss) and **MW4** (Balsam fir – Red maple / Wood sorrel – Goldthread). Early successional stages can be by-passed if, at the time of disturbance, advanced hemlock regeneration is present and retained. Depending on disturbance history this VT can be even-aged, but it will develop an uneven-aged structure as it matures. Between large-scale disturbance events this VT will maintain itself through gap replacement.

Ecological Features

This closed canopy forest is matrix-forming in central Nova Scotia and a large patch forest elsewhere. The shade tolerance and longevity of hemlock and yellow birch promote development of uneven-aged canopy structure and old growth. Large trees can provide nest sites for pileated woodpeckers, red-tailed hawks and northern goshawks. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Mixedwood forests can also provide both shelter and food for overwintering deer. Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals. Birch trees in these forests may be deformed and killed by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.

Characteristic Plants	MW3 Freq. (%)	MW3 Cover (%)
Hemlock	100	38.0
Red maple	82	18.6
Yellow birch	82	11.3
Sugar maple	50	9.4
Balsam fir	50	8.1
Red spruce	44	9.2
White ash	29	4.0
White birch	24	10.4
White pine	24	5.0
Beech	18	4.8
Ironwood	15	4.2
White spruce	15	3.4
Tree Layer (Mean % Cover)		**83**
Balsam fir	100	4.8
Hemlock	88	1.9
Striped maple	76	1.4
Red maple	68	1.9
Red spruce	59	2.9
Fly-honeysuckle	59	0.5
Sugar maple	56	0.5
Yellow birch	53	3.0
Beech	53	1.5
White ash	44	0.1
White pine	38	1.5
White spruce	32	1.0
Shrub Layer (Mean % Cover)		**17**
Wild lily of the valley	100	2.6
Starflower	88	0.6
Evergreen wood fern	76	3.8
Rose twisted stalk	50	0.1
Indian pipe	47	0.1
Wood aster	47	0.1
Christmas fern	44	1.2
Sarsaparilla	44	0.7
Bluebead lily	41	0.4
Indian cucumber root	41	0.1
New York fern	38	8.3
Northern beech fern	35	1.1
Partridge berry	35	0.5
Ground pine	32	0.5
Cinnamon fern	29	0.5
Goldthread	29	0.5
Painted trillium	29	0.1
Wood sorrel	26	0.7
Twinflower	24	1.3
Violets	24	0.2
Bunchberry	21	3.3
Herb Layer (Mean % Cover)		**16**
Stair-step moss	82	10.4
Bazzania	79	2.5
Broom moss	76	0.9
Schreber's moss	71	5.1
Hypnum moss	68	1.1
Wavy dicranum	29	0.9
Shaggy moss	21	1.0
Fern moss	21	0.3
Hair cap moss	21	0.2
Pin cushion moss	21	0.2
Bryo-Lichen Layer (Mean % Cover)		**17**

Distinguishing Features

This mixedwood forest occurs on well drained soils dominated by yellow birch and hemlock with a significant component of red maple. Striped maple and fly-honeysuckle along with ferns are very common in the well developed shrub and herb layers.

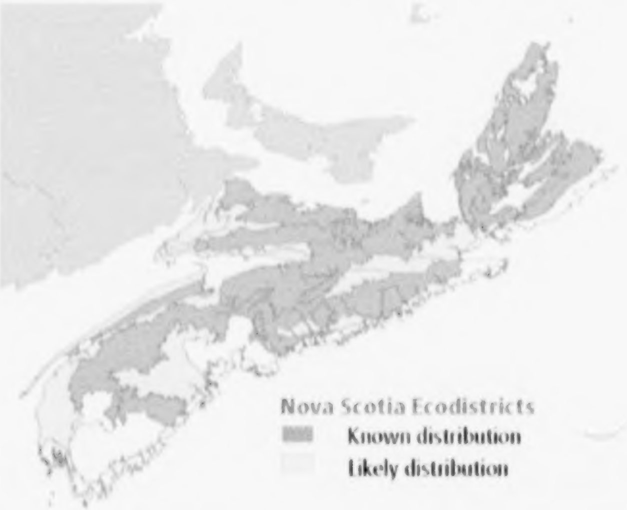
Yellow birch

Site Characteristics

Slope Position: Level^{1} Lower^{1} Middle^{7} Upper^{7}
Surface Stoniness: (Non - Slightly)^{8} (Moderately)^{7}
Bedrock Outcrop: (Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range: 15 - 152m
Slope Gradient: Gentle^{4} Level^{1} Steep^{1} Other^{1} nd^{1}
Aspect: North^{1} East^{7} South^{7} West^{1} None^{7}
Exposure: Moderate^{6} Sheltered^{7} Mod. exposed^{1} Mod. sheltered^{1}
Microtopography: Moderately^{4} Slightly^{4} Strongly^{7}
Drainage: Moderately well^{4} Imperfect^{1} Well^{1}

Soil Characteristics

Soil Type: ST2^{7} ST6^{7} ST1^{1} ST2-L^{1} ST3-L^{1} ST8^{1} ST12^{1} Other^{1}
Parent Material: Glacial till^{7} Alluvium^{1} Colluvium^{1} Glaciofluvial^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{4} (>45)^{4} nd^{1}
Duff Thickness (cm): (0-5)^{7} (6-10)^{5} (11-20)^{7} nd^{1}



Moose River,
Pictou County

MW4

Balsam fir – Red maple / Wood sorrel – Goldthread

Abies balsamea – Acer rubrum /
Oxalis acetosella – Coptis trifolia

n=12

Concept: This early to mid-successional mixedwood Vegetation Type (VT) has an overstory co-dominated by balsam fir and red maple, with a variety of other associates. MW4 is a broadly defined VT that follows stand replacing disturbance events such as windthrow or harvesting. Residual trees (survivors of past disturbance events) should not be used for classifying this VT from others. Due to the short-lived nature of balsam fir, this VT often has significant levels of coarse wood debris and/or numerous snags. Balsam fir – Red maple / Wood sorrel – Goldthread is a commonly found VT in eastern Nova Scotia.

Vegetation: Balsam fir and red maple are the dominant overstory trees, with lesser red spruce, yellow birch, white birch, white spruce and/or aspen. Minor levels of black spruce can also be found on some sites. The shrub layer is moderately developed and includes mainly regenerating trees (especially balsam fir and red maple). The herb layer is represented by common forest flora (e.g. wild lily-of-the-valley, starflower, bluebead lily, goldthread and wood sorrel). Bracken, hay scented fern and cinnamon fern can also be found – their presence and relative abundance reflecting available moisture. Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstory. Schreber's moss, stair-step moss and broom moss are the main species. Bazzania can also be common where coarse woody debris has accumulated on the forest floor.

Environmental Setting: MW4 is mainly associated with fresh to moist, nutrient medium soils of variable texture. This VT is common throughout eastern Nova Scotia and is scattered elsewhere. It is common throughout the Maritime provinces, but less frequent across higher elevation of northern New Brunswick.

Successional Dynamics: MW4 is an early to mid successional VT dominated by balsam fir and red maple. It is an even-aged forest that usually follows stand-level disturbances such as windthrow and harvesting. MW4 can sometimes renew itself through natural stand deterioration (facilitated by minor insect predation, disease and natural senescence) followed by development of advanced regeneration. Over time, and with possible increases in red spruce presence, MW4 could succeed to other VTs including: SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum), SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) or MW1 (Red spruce – Yellow birch / Evergreen wood fern). Residuals in the overstory can provide evidence of pre-disturbance conditions and should be considered when assessing possible successional trends.

Ecological Features

This closed canopy forest typically occurs as large patches following stand level disturbances such as fire or harvesting. Regeneration is by seed and coppice. This ecosystem provides several ecological functions including the facilitation of nutrient cycling, rapid site revegetation after disturbance, and the establishment of nurse crops for later successional species such as red spruce, hemlock and yellow birch. Residual trees from early successional stages are common and may provide notable wildlife habitat values and increased forest structural complexity. Mixedwood forests can also provide both shelter and food for overwintering deer. Sapling stage forests are an ideal habitat for snowshoe hare, and are a favoured browsing habitat for moose and deer. Red maple provides one of the most important early and abundant sources of pollen and nectar for a wide range of insects.

Characteristic Plants	MW4 Freq (%)	MW4 Cover (%)
Red maple	100	29.8
Balsam fir	92	36.0
Red spruce	42	12.4
Yellow birch	42	8.2
White spruce	33	8.0
Trembling aspen	25	5.7
White birch	25	4.0
Black spruce	17	10.0
Tree Layer (Mean % Cover)		**82**
Balsam fir	100	3.9
Red maple	92	1.8
Velvet-leaf blueberry	58	0.2
Serviceberry	50	0.1
Red spruce	42	5.4
False holly	42	0.7
Lambkill	42	0.4
Yellow birch	33	1.3
Striped maple	33	0.5
Wild raisin	33	0.1
Trembling aspen	25	0.3
Red oak	25	0.2
Fly honeysuckle	25	0.1
Lowbush blueberry	25	0.1
Shrub Layer (Mean % Cover)		**13**
Wild lily of the valley	100	2.6
Starflower	92	1.3
Goldthread	83	2.7
Bunchberry	75	5.0
Wood sorrel	67	12.6
Cinnamon fern	67	3.2
Sarsaparilla	67	1.5
Evergreen wood fern	67	1.3
Bluebead lily	67	0.7
New York fern	58	5.1
Wood aster	58	0.8
Bracken	50	2.6
Interrupted fern	42	1.6
Ground pine	42	0.3
Hay-scented fern	33	0.2
Indian pipe	33	0.1
Twinflower	25	2.4
Bristly club-moss	25	0.2
Partridge berry	25	0.2
Violets	25	0.2
White panicle aster	25	0.1
Herb Layer (Mean % Cover)		**31**
Broom moss	100	1.3
Schreber's moss	83	14.7
Stair-step moss	83	13.8
Bazzania	83	6.9
Common green sphagnum	58	2.7
Hypnum moss	58	0.9
Hair-cap moss	50	2.2
Wavy dicranum	42	3.3
Grey reindeer lichen	25	0.1
Bryo-Lichen Layer (Mean % Cover)		**36**

Distinguishing Features

This mixedwood forest of balsam fir and red maple establishes after a stand-level disturbance. The herbaceous layer is generally comprised of common woodland plants such as wild lily-of-the-valley, starflower, bluebead lily, goldthread and wood sorrel.

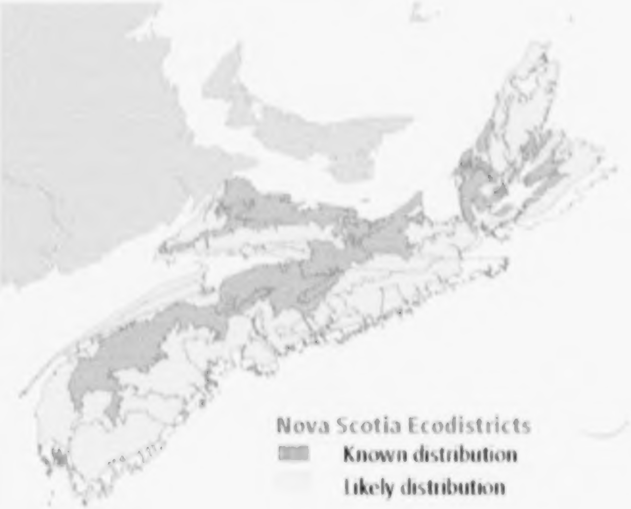
Bluebead lily

Site Characteristics

Slope Position:	Level^5 Lower^2 Upper^2 Toe^1
Surface Stoniness:	(Non - Slightly)^8 (Moderately)^1 (Very - Excessively)^1
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	39 - 252m
Slope Gradient:	Level^6 Gentle^4
Aspect:	North^1 East^1 South^1 West^2 None^5
Exposure:	Moderate^6 Mod. exposed^2 Mod. sheltered^2
Microtopography:	Moderately^6 Slightly^4
Drainage:	Imperfect^6 Moderately well^4

Soil Characteristics

Soil Type:	ST6^5 ST2^1 ST3^1 ST5^1 ST9^1 ST12^1
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^3 (30-45)^7
Duff Thickness (cm):	(6-10)^6 (11-20)^3 nd^1



Fox River,
Cumberland County

MW5

White birch – Balsam fir / Starflower

Betula papyrifera – Abies balsamea / Trientalis borealis

n=4

Concept: This early successional mixedwood Vegetation Type (VT) has an overstory co-dominated by white birch and balsam fir. Various other trees may have a minor presence. MW5 is a broadly defined VT that follows stand replacing disturbance events such as windthrow or harvesting. Residual trees (survivors of past disturbance events) should not be used for classifying this VT from others. Due to the short-lived nature of balsam fir, this VT often supports significant levels of coarse wood debris and/or numerous snags. White birch – Balsam fir / Starflower is commonly found VT in eastern Nova Scotia.

Vegetation: White birch and balsam fir are the dominant overstory trees, with lesser red spruce, yellow birch, white spruce and/or red maple. Minor amounts of black spruce, hemlock and white pine can also be found on some sites. The shrub layer is moderately developed and dominated by regenerating trees (especially balsam fir and red maple). The herb layer is represented by typical forest flora including wild lily of the valley, starflower, bluebead lily, goldthread and wood sorrel. Bracken, hay-scented fern and cinnamon fern can also be found – their presence and relative abundance reflecting available moisture. Bryophyte development varies; its coverage directly related to softwood overstory abundance. Schreber's moss, stair-step moss and broom moss are the main species. Bazzania can also be common where coarse woody debris has accumulated on the forest floor.

Environmental Setting: MW5 is mainly associated with fresh to moist, nutrient-medium soils of variable texture. This VT has not been well sampled but appears to occur throughout eastern Nova Scotia and is scattered elsewhere. It is common in New Brunswick and Prince Edward Island.

Successional Dynamics: MW5 is an early successional VT dominated by white birch and balsam fir. It is an even aged VT that usually follows stand-level disturbances such as windthrow and harvesting. As the short-lived and shade-intolerant white birch starts to lose overstory dominance, other mid and late successional VTs can develop including SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum) and SH8 (Balsam fir / Wood fern / Schreber's moss). Residuals in the overstory can provide evidence of pre-disturbance conditions and should be considered when assessing possible successional trends.

Ecological Features

This closed canopy patch forest typically follows stand-level disturbances such as harvesting. Regeneration is by seed or coppice. This ecosystem provides several ecological functions including the facilitation of nutrient cycling, rapid site revegetation after disturbance, and the establishment of nurse crops for later successional species such as red spruce, hemlock and yellow birch. Residual trees from early successional stages are common and may provide notable wildlife habitat values and increased forest structural complexity. Mixedwood forests provide both shelter and food for overwintering deer. Sapling stage occurrences may provide browsing habitat for snowshoe hare, deer and moose.

Characteristic Plants	MW5 Freq. (%)	MW5 Cover (%)
White birch	100	41.8
Balsam fir	75	32.0
White spruce	75	7.7
Red spruce	50	13.5
Yellow birch	50	7.0
Hemlock	50	0.1
Red maple	50	0.1
Black spruce	25	5.0
White pine	25	5.0
Tree Layer (Mean % Cover)		**84**
Balsam fir	100	3.1
Wild raisin	75	0.4
Red maple	50	21.6
Black spruce	50	4.3
White birch	50	3.0
Velvet-leaf blueberry	50	0.5
Lambkill	50	0.1
Mountain ash	50	0.1
White pine	50	0.1
Fly-honeysuckle	25	0.5
Striped maple	25	0.5
Beech	25	0.3
Bush-honeysuckle	25	0.1
False holly	25	0.1
Hemlock	25	0.1
Serviceberry	25	0.1
Sugar maple	25	0.1
Shrub Layer (Mean % Cover)		**19**
Starflower	100	0.1
Wild lily-of-the-valley	75	8.1
Bracken	75	4.3
Indian pipe	75	0.1
Evergreen wood fern	50	4.0
Bunchberry	50	3.0
Twinflower	50	1.1
Bluebead lily	50	0.1
Painted trillium	50	0.1
Wood-sorrel	25	40.0
Goldthread	25	16.0
Shining club-moss	25	4.5
Hay-scented fern	25	2.0
Bristly club-moss	25	0.1
Cinnamon fern	25	0.1
Cow-wheat	25	0.1
Eastern spreading wood fern	25	0.1
Interrupted fern	25	0.1
Partridge berry	25	0.1
Pink lady's slipper	25	0.1
Rose twisted-stalk	25	0.1
Running club-moss	25	0.1
Wood reed	25	0.1
Herb Layer (Mean % Cover)		**30**
Broom moss	100	2.9
Schreber's moss	75	6.7
Stair-step moss	75	1.9
Bazzania	75	1.3
Hypnum moss	75	1.1
Wavy dicranum	50	1.3
Bryo-Lichen Layer (Mean % Cover)		**12**

Distinguishing Features

This mixedwood forest of balsam fir and red maple establishes after a stand-level disturbance. The herbaceous layer is generally comprised of common woodland plants such as wild lily-of-the-valley, starflower, bluebead lily, goldthread and wood sorrel.

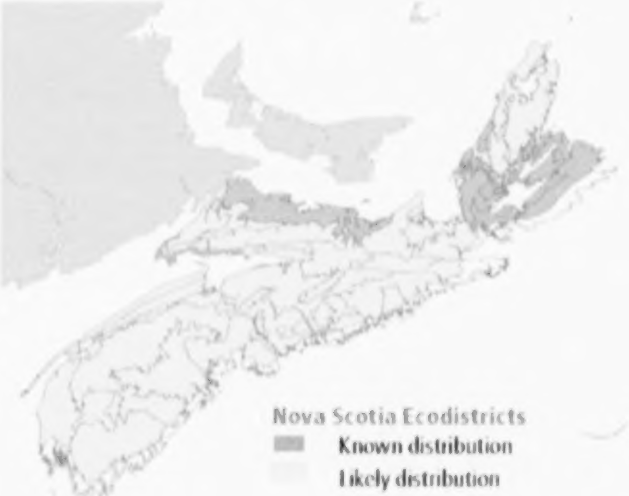
Starflower

Site Characteristics

Slope Position:	Middle^5 Upper^5
Surface Stoniness:	(Non - Slightly)^8 (Very - Excessively)^7
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	83 - 144m
Slope Gradient:	Gentle^8 Steep^7
Aspect:	East^3 South^4 West^3
Exposure:	Moderate^5 Mod. exposed^5
Microtopography:	Moderately^6 Slightly^7 Strongly^7
Drainage:	Well^8 Moderately well^7

Soil Characteristics

Soil Type:	ST2^6 ST1^7 ST6^7
Parent Material:	Glacial till^8 Colluvium^7
Rooting Depth (cm):	(30-45)^6 (>45)^7 nd^7
Duff Thickness (cm):	(6-10)^8 nd^7



OF Old Field Forest Group

(n = 60)

OF1	White spruce / Aster – Goldenrod / Shaggy moss
OF2	Tamarack / Speckled alder / Rough goldenrod / Shaggy moss
OF3	White pine – Balsam fir / Shinleaf – Pine-sap
OF4	Balsam fir – White spruce / Evergreen wood fern – Wood aster
OF5	Trembling aspen – Grey birch / Rough goldenrod – Strawberry

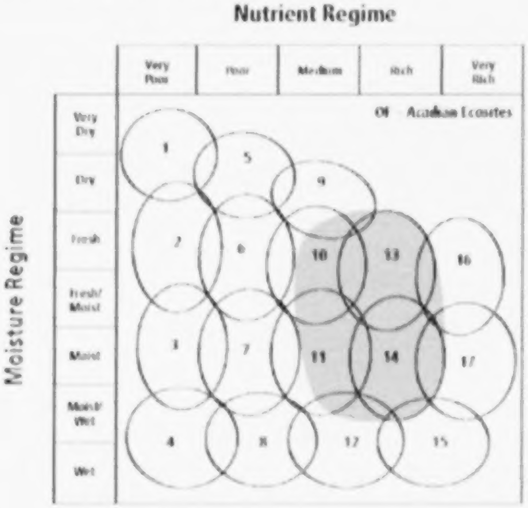
Concept: These are forests originating on abandoned farmland where soils have been enriched through the addition of organic matter by tillage or grass cover (pasture). Vegetation Types (VT) are early successional and typically dominated by softwood species. Old field VTs usually develop full overstory canopies with sparse understory cover and a needle carpet or moss dominated forest floor. These are short-lived, even-aged forests which often succumb to insects and disease. All VTs in this group are found in the Acadian Ecosite group, with several also found in the Maritime Boreal Ecosite group.

Vegetation: These closed canopy forests are typically dominated by white spruce, tamarack, white pine or balsam fir. An aspen dominated VT has also been identified. Red oak and white ash can sometimes be found on richer old field sites, but no separate VT has been described for this situation. Both the shrub and herb layers can be species diverse, but they are usually poorly developed. Herbs associated with agricultural lands are common. Schreber's moss and shaggy moss are the main bryophytes found where needle carpet or leaf litter do not dominate the forest floor.

Environmental Setting: Vegetation types in this group are found on a range of slope positions. Many sites have been cleared of surface rocks which have been piled or arranged as walls along property lines. Soils are mainly derived from glacial till deposits and usually have a distinctive Ap (plough layer) horizon caused by tilling or pasture cover. This organically enriched Ap horizon may be less well developed (or even absent) on some old pasture sites. Microtopography is also usually smooth (level) where tilling has occurred. A wide range of moisture levels can be found, but fertility is generally medium to rich throughout. These forests are found throughout the province, but are most common on the Nova Scotia Uplands (300) and Fundy Shore (900) ecoregions, and on drumlins in the Clare (730) and LaHave Drumlins (740) ecodistricts.

Successional Dynamics: Old field forests are early successional VTs that develop on sites modified by clearing and agricultural use. Clearcut harvesting of mature stands is likely to initiate another early successional stage dominated by shade-intolerant hardwood species such as grey birch, aspen, pin cherry and white birch. Stands that slowly deteriorate may provide more opportunity for shade-tolerant species to become established if seed sources are nearby. It is expected that several rotations will be needed before original forest conditions become re-established on most old field sites in the province.

Edatopic Grids


Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
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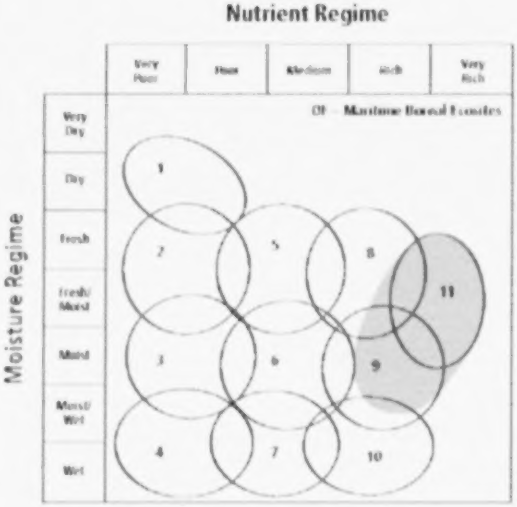
Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
Wet
OF – Maritime Boreal Ecosites
1
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Ecological Features

Since the early 1900's, large areas of abandoned agricultural land have reverted to early successional softwood forest. These distinctive patches add structural diversity to the landscape, often providing strong transitional zones between fields and natural hardwood forests. These ecosystems are relatively simple, frequently dominated by one tree species with minimal understory development. Following stand collapse or harvesting some species indicative of pre-farming stand composition may develop in the next successional stage, but several rotations are required before pre-agricultural forest can be more fully returned to a site. A dense needle carpet and frequent levels of Schreber's and shaggy mosses are the most distinguishing features of the forest floor, where low light availability generally results in reduced shrub and herbaceous cover and diversity. Extensive fruiting of mycorrhizal mushrooms, including chanterelle and boletes, may occur in late summer and fall. The presence of old rock walls and foundations, apple trees and nearby fields and active farms makes this particularly unique and productive habitat for a number of wildlife species.

Farmville,
Lunenburg County

OF1

White spruce / Aster – Goldenrod / Shaggy moss

Picea glauca / Aster spp. – Solidago spp. / Rhytidiadelphus triquetris

n=25

Concept: This early successional Vegetation Type (VT) has abundant white spruce, often with a minor component of balsam fir. OF1 stands usually develop closed overstory canopies resulting in needle carpet and/or moss-dominated forest floors with minimal shrub and herb cover. OF1 represents the dominant softwood forest associated with abandoned agricultural lands in central and eastern Nova Scotia.

Vegetation: White spruce is the dominant overstory tree. Common associates include balsam fir, red maple and tamarack. Both the shrub and herb layers can be species rich, but they are usually poorly developed. Hawkweeds, goldenrods, asters and several grass species are indicative of past agricultural land-use. Other common, but seldom abundant, species include strawberry, common speedwell, tall buttercup and bedstraws. Moss cover can be variable and interspersed with needle carpet. Where present, species include shaggy moss, Schreber's moss, broom moss, hair cap moss and stair-step moss.

Environmental Setting: OF1 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of variable texture. This VT is found throughout Nova Scotia, but is primarily associated with several Nova Scotia Upland ecodistricts (Cobequid Hills, Cobequid Slopes, Cape Breton Hills, Pictou-Antigonish Highlands) and the Atlantic Coastal and Fundy Shore ecoregions. Sites that have been tilled or pastured have level micro-topography and a distinct Ap (plough layer) soil horizon.

Successional Dynamics: OF1 is an even-aged, early successional VT dominated by white spruce. Although white spruce has the ability to regenerate grassy microsites, old field trees tend to have a shorter lifespan than those found in natural forest conditions. They also do not re-establish under their own cover, which inevitably leads to ecosystem collapse. Natural disturbance agents include insects (e.g. bark beetles, tussock moth, spruce budworm) and windthrow. Subsequent successional stages usually include species indicative of pre-agricultural forest cover, especially if such seed sources are nearby. Stands that slowly deteriorate are more likely to succeed to such forest conditions as shade-tolerant species regenerate on site. Clearcut harvesting may initiate an earlier successional stage dominated by grey birch, pin cherry, aspen, white birch and/or other woody shrubs. Depending in part on the level of advanced regeneration at time of harvest, OF1 may also succeed to OF4 (Balsam fir – White spruce / Evergreen wood fern – Wood aster) or other VTs dominated by shade-intolerant species such as white birch, aspen and red maple. As many OF1 sites were originally tolerant hardwood sites, later successional stages are likely to include a component of sugar maple, yellow birch and/or beech, possibly leading to TH1 (Sugar maple / Hay-scented fern) or TH2 (Sugar maple / New York fern – Northern beech fern).

Ecological Features

Past cultivation across this patch forest has leveled most pre-disturbance micro-topography, while rock walls and piles, old foundations and wells provide additional evidence of agricultural land use. Linear rock piles may provide habitat for small cavity dwellers including rodents, snakes, and ground dwelling insects like wasps and bees. Other unique aspects include the forest's close proximity to open fields and active farms and the frequent presence of apple and other fruit trees. These features may attract deer, red fox, coyotes, red squirrels, small mammals, and birds including ruffed grouse, thrushes, crows and blue jays. OF1 provides excellent growing conditions for mycorrhizal mushrooms such as chanterelle and boletes, which are allied with spruce. Although these forests add to landscape structural diversity, they have a simplified ecological make-up, reflected by low tree diversity, structural complexity, and deadwood volume. Mature forests are highly susceptible to spruce bark beetle attack, leading to their rapid collapse.

Characteristic Plants

	OF1	
	Freq. (%)	Cover (%)
White spruce	100	60.3
Balsam fir	52	17.7
Red maple	17	4.8
Tamarack	13	2.3
Tree Layer (Mean % Cover)		**72**
Balsam fir	70	1.5
Red maple	57	1.0
Mountain ash	26	0.6
Wild raisin	26	0.1
White spruce	22	1.4
White ash	22	0.2
Shrub Layer (Mean % Cover)		**4**
Starflower	83	1.1
Wild lily of the valley	74	3.2
Evergreen wood fern	52	2.8
Bunchberry	48	3.8
Violets	43	1.5
Rough goldenrod	35	0.1
Common speedwell	30	0.8
Indian pipe	30	0.8
Fibrous-root sedge	26	5.2
Dwarf raspberry	26	1.0
Sarsaparilla	26	0.1
Goldthread	22	7.6
Tall buttercup	22	2.7
Hawkweeds	22	0.6
Three-seeded sedge	22	0.4
Herb Layer (Mean % Cover)		**17**
Schreber's moss	83	22.4
Broom moss	74	2.8
Hair-cap moss	70	3.1
Stair-step moss	57	16.5
Shaggy moss	57	15.5
Hypnum moss	39	1.4
Plume moss	35	0.2
Wavy dicranum	22	2.2
Rhytidiadelphus moss	13	1.0
Goose neck moss	4	1.2
Bryo-Lichen Layer (Mean % Cover)		**44**

Distinguishing Features

This softwood forest on well drained soils is extensively white spruce. Rock foundations, rock piles, rock walls and wire fencing are indicators of past agricultural use. Level microtopography and a soil profile that shows a plough layer are good site indicators. Dense stands have poorly developed herb and moss layers.

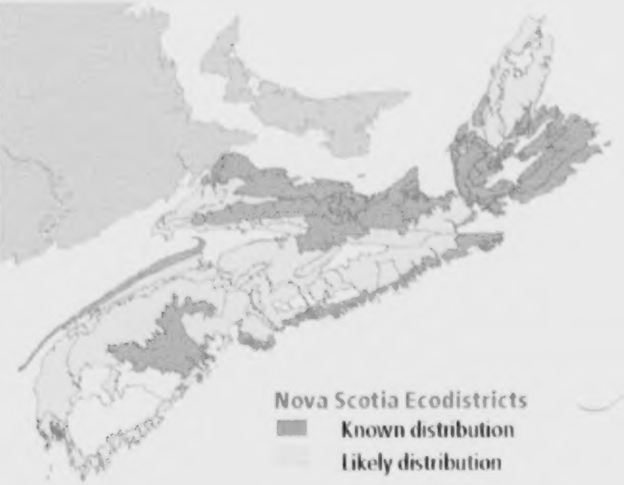
Shaggy moss

Site Characteristics

Slope Position:	Lower^{4} Level^{2} Middle^{2} Upper^{2}
Surface Stoniness:	(Non - Slightly)^{8} (Moderately)^{2}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	9 - 310m
Slope Gradient:	Gentle^{5} Level^{2} Moderate^{2} Strong^{1}
Aspect:	North^{1} East^{2} South^{2} West^{2} None^{2} nd^{1}
Exposure:	Moderate^{4} Mod. exposed^{3} Exposed^{2} Mod. sheltered^{1}
Microtopography:	Level^{7} Moderate^{1} Slightly^{1} Other^{1}
Drainage:	Well^{6} Imperfect^{2} Moderately well^{2}

Soil Characteristics

Soil Type:	ST8^{5} ST2-L^{2} ST9^{1} ST11^{1} Other^{1}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^{2} (30-45)^{3} (>45)^{5}
Duff Thickness (cm):	(0-5)^{4} (6-10)^{4} (11-20)^{1} nd^{1}



Sugar Camp Brook
Quarry, Inverness

OF2

Tamarack / Speckled alder / Rough goldenrod / Shaggy moss

Larix laricina / Alnus incana / Solidago rugosa / Rhytidiadelphus triquetris

n=7

Concept: This early successional Vegetation Site (VT) has abundant tamarack and white spruce, often with a minor component of black spruce or balsam fir. This VT is similar to OF1 (White spruce / Aster – Goldenrod / Shaggy moss), but is usually found on moister sites. OF2 stands usually have fully developed canopies resulting in needle carpet and/or moss-dominated forest floors with reduced shrub and herb cover. OF2 is found throughout the province on imperfectly drained old field sites.

Vegetation: Tamarack and white spruce are the dominant overstory trees. Black spruce, Balsam fir and red maple are common associates. The poorly to moderately developed shrub layer consists mainly of regenerating trees along with wild raisin and speckled alder. The herb layer is better developed, with species like hawkweeds, goldenrods, asters, strawberry, common speedwell, tall buttercup, bedstraws and grasses; most of which reflect previous agricultural land-use. Cinnamon fern, interrupted fern, sedges and sensitive fern can also be found on sites with higher relative soil moisture. Moss cover can be variable and interspersed with needle carpet. Where present, moss species include Schreber's moss, shaggy moss and stair-step moss. Sphagnum species can also be found on wetter microsites in the stand.

Environmental Setting: OF2 is mainly associated with moist to moist-wet, nutrient medium to rich soils of variable texture. This VT is scattered throughout Nova Scotia wherever imperfectly drained old field sites are found. Sites that have been tilled or pastured have level microtopography and a distinct Ap (plough layer) soil horizon.

Successional Dynamics: OF2 is an even-aged, early successional VT dominated by tamarack and white spruce. The short life span of these species, and their inability to re-establish themselves under their own canopy cover, are factors which eventually lead to the collapse of this ecosystem. Natural disturbance agents include insects (e.g. larch sawfly, larch casebearer, bark beetles, tussock moth, spruce budworm) and windthrow. Subsequent successional stages usually include species indicative of original pre-agricultural forest cover, especially if suitable seed sources are nearby. Stands that slowly deteriorate are more likely to succeed to such forest conditions as shade-tolerant species start to regenerate on site. Clearcut harvesting may trigger an earlier successional stage dominated by grey birch, pin cherry, aspen, white birch and/or other woody shrubs. Depending in part on the level of advanced regeneration present at time of harvest, OF2 may also succeed to OF4 (Balsam fir – White spruce / Evergreen wood fern – Wood aster), OF5 (Trembling aspen – Grey birch / Rough goldenrod – Strawberry) or other VTs dominated by white birch and/or red maple. Other possible successional stages include **MW4** (Balsam fir – Red maple / Wood sorrel – Goldthread) and eventually **MW1** (Red spruce – Yellow birch/ Evergreen wood fern).

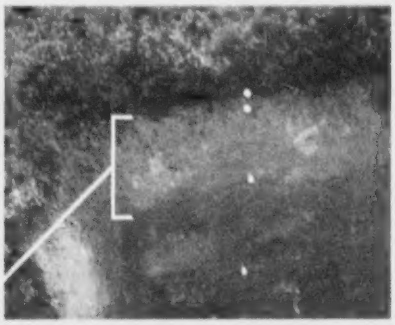
Ecological Features

Past cultivation across this patch forest has leveled most pre-disturbance microtopography, while rock walls and piles, old foundations and wells provide additional evidence of agricultural land use. Linear rock piles may provide dwellings for rodents, snakes, and insects like wasps and bees. Other unique aspects include the forest's close proximity to open fields and active farms and the frequent presence of fruit trees. These features may attract deer, red fox, coyotes, red squirrels, small mammals, and several birds including ruffed grouse, thrushes, crows and blue jays. Alders provide habitat for woodcock. OF2 has excellent growing conditions for mycorrhizal mushrooms including chanterelle and hollow foot suillus, which are respectively allied with spruce and larch. Although these forests add to landscape structure, they have a simplified ecological make-up, reflected by low tree diversity, structural complexity and deadwood volume.

Characteristic Plants	OF2	
	Freq. (%)	Cover (%)
Tamarack	100	36.1
White spruce	71	31.2
Black spruce	43	11.7
Balsam fir	43	4.3
Red maple	29	22.5
Grey birch	14	15.0
White birch	14	4.0
Red spruce	14	0.1
Wild apple	14	0.1
Tree Layer (Mean % Cover)		**74**
Balsam fir	86	1.8
Red maple	71	2.0
White spruce	57	1.3
Wild raisin	57	0.2
Speckled alder	43	2.0
Black spruce	43	1.5
Lambkill	43	0.2
Mountain-ash	43	0.1
Velvet-leaf blueberry	29	0.8
Bristly black currant	29	0.3
Lowbush blueberry	29	0.3
Shrub Layer (Mean % Cover)		**6**
Starflower	100	0.8
Wild lily-of-the-valley	86	6.8
Rough goldenrod	71	0.6
Dwarf raspberry	57	10.1
Bunchberry	57	3.5
Violets	57	0.6
Drooping wood sedge	57	0.3
Bladder sedge	57	0.1
Evergreen wood fern	57	0.1
Goldthread	57	0.1
Common speedwell	43	3.7
Tall buttercup	43	1.7
Three-seeded sedge	43	1.5
Crested wood fern	43	0.8
Sarsaparilla	43	0.2
Common woodrush	43	0.1
Tall white aster	43	0.1
Lady fern	29	3.0
Spinulose wood fern	29	2.8
Cinnamon fern	29	1.5
Poverty grass	29	1.0
Sensitive fern	29	0.3
White panicle aster	29	0.3
Lions paw	29	0.2
Bluebead lily	29	0.1
Herb Layer (Mean % Cover)		**24**
Schreber's moss	86	33.3
Shaggy moss	86	12.5
Stair-step moss	71	10.7
Hair cap moss	57	1.3
Wavy dicranum	57	0.4
Common green sphagnum	43	13.7
Broom moss	43	0.4
Ladies' tresses	29	10.0
Fern moss	29	0.6
Hypnum moss	29	0.3
Bryo-Lichen Layer (Mean % Cover)		**59**

Distinguishing Features

This softwood forest on imperfectly drained soils is dominated by tamarack with white spruce. Level microtopography and a soil profile that shows a plough layer are good site indicators. Sphagnum moss is common in depressions.

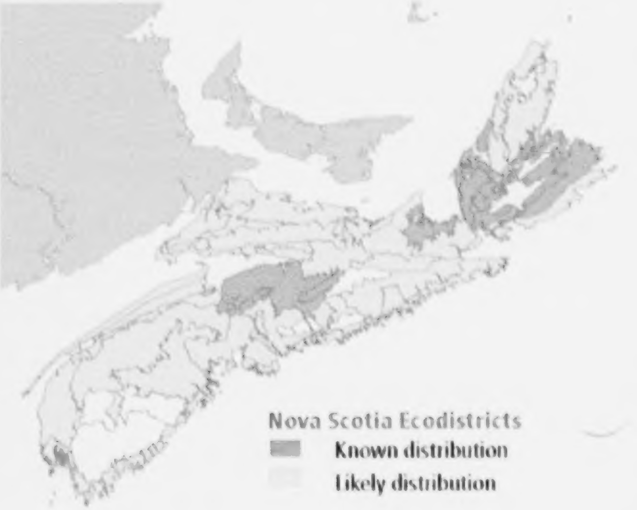


Site Characteristics

Slope Position: Lower^3 Middle^3 Level^3 Upper^1
Surface Stoniness: (Non - Slightly)^9 (Moderately)^1
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 4 - 152m
Slope Gradient: Gentle^6 Level^4
Aspect: North^3 East^4 West^1 None^2
Exposure: Moderate^8 Mod. exposed^1 Mod. Sheltered^1
Microtopography: Slightly^6 Level^4
Drainage: Imperfect^4 Moderately well^3 Poor^1

Soil Characteristics

Soil Type: ST12^5 ST13^2 ST3-L^1 ST7^1 ST9^1
Parent Material: Glacial till^{10}
Rooting Depth (cm): (<30)^4 (30-45)^5 (>45)^1
Duff Thickness (cm): (0-5)^8 (6-10)^1 (11-20)^1



Horne Settlement, Hants County

OF3

White pine – Balsam fir / Shinleaf – Pine-sap

Pinus strobus – Abies balsamea / Pyrola elliptica – Monotropa hypopithys

n=10

Concept: This early to mid successional Vegetation Type (VT) has abundant white pine in the canopy with only a scattered mix of other species. OF3 stands usually develop full overstory canopies resulting in needle carpet and/or moss dominated forest floors with reduced shrub and herb cover. White pine – Balsam fir / Shinleaf – Pine-sap represents the dominant softwood forest associated with abandoned agricultural lands in western Nova Scotia.

Vegetation: White pine is the dominant overstory tree. Common associates include white spruce, red maple and red spruce. Scattered sugar maple and black cherry can also be found in some stands. The shrub layer is usually poorly developed with balsam fir regeneration providing most of the cover. Herb layer development is also restricted, with typical upland species such as wild lily-of-the-valley, starflower, partridge-berry and goldthread. Sporadic occurrence of hawkweeds, goldenrods, asters and common speedwell reflect past agricultural land use. Moss cover can be variable and interspersed with needle carpet. Where present, Schreber's moss and hair-cap moss are the main moss species, with shaggy moss also found in some stands.

Environmental Setting: OF3 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of medium to coarse texture (although finer textures can sometimes be found). This VT is found mainly in western Nova Scotia, often on drumlins. Sites that have been tilled or pastured will have level microtopography and a distinct Ap (plough layer) soil horizon.

Successional Dynamics: OF3 is an even-aged, early to mid-successional VT dominated by white pine. As a long-lived species, white pine will generally maintain its presence in these stands as they develop over time. Usually balsam fir is the first to become prolific in the understory, but eventually other shade-tolerant species (such as red spruce, hemlock, sugar maple and beech) will also appear, especially if suitable seed sources are nearby. Natural disturbance agents include insects and disease (e.g. white pine weevil, white pine blister rust), fire and windthrow. Clearcut harvesting may trigger an earlier successional stage dominated by aspen, white birch and/or red maple). Depending in part on the level of advanced regeneration at time of harvest, OF3 may also succeed to OF4 (Balsam fir – White spruce / Evergreen wood fern – Wood aster) or other VTs dominated by balsam fir, red spruce, white pine or hemlock. On many drumlins, the long and intense history of agricultural land use often masks any signs of original forest composition. However, available evidence suggests that most sites likely supported a climax hemlock-beech mixedwood ecosystem similar to MW3 (Hemlock – Yellow birch / Evergreen wood fern).

Ecological Features

This forest occurs in small patches of abandoned agricultural land, primarily on drumlins in western Nova Scotia. Past cultivation has leveled most pre-disturbance microtopography, while rock walls and piles, old foundations and wells provide additional evidence of agricultural land use. Linear rock piles may provide dwellings for rodents, snakes, and insects like wasps and bees. Other unique aspects include the forest's close proximity to open fields and active farms and the frequent presence of apple and other fruit trees. These features may attract deer, red fox, coyotes, red and flying squirrels, and several birds including ruffled grouse and American kestrel. Although these forests add to landscape structure, they have a simplified ecological make-up, reflected by low tree diversity, structural complexity and deadwood volume.

Characteristic Plants	OF3	
	Freq. (%)	Cover (%)
White pine	100	70.2
White spruce	44	8.8
Red maple	44	6.8
Red spruce	33	3.3
Grey birch	33	1.0
Sugar maple	11	13.0
Black cherry	11	12.0
Black spruce	11	7.0
Red oak	11	5.0
Balsam fir	11	0.1
Tamarack	11	0.1
White birch	11	0.1
Tree Layer (Mean % Cover)		**83**
Balsam fir	100	2.6
White pine	67	0.7
Red maple	56	0.9
Velvet-leaf blueberry	44	1.1
White ash	44	0.7
Wild raisin	44	0.1
Red spruce	33	1.0
Red oak	33	0.1
Serviceberry	33	0.1
Lowbush blueberry	22	0.8
Meadow sweet	22	0.2
Black cherry	22	0.1
Hemlock	22	0.1
Mountain-ash	22	0.1
Shrub Layer (Mean % Cover)		**6**
Wild lily of the valley	89	3.3
Starflower	56	1.0
Common speedwell	56	0.3
Shinleaf	56	0.2
Teaberry	44	0.3
Common woodrush	44	0.2
Partridge berry	44	0.1
Pink lady's slipper	44	0.1
Goldthread	33	0.8
Poverty grass	33	0.3
Bracken	33	0.1
Checkered rattlesnake plantain	33	0.1
Pine sap	33	0.1
Violets	22	1.5
Sarsaparilla	22	1.5
Ground pine	22	0.3
Drooping wood sedge	22	0.2
Evergreen wood fern	22	0.1
Indian cucumber root	22	0.1
Herb Layer (Mean % Cover)		**12.0**
Schreber's moss	78	26
Hair-cap moss	67	4.0
Hypnum moss	56	0.7
Broom moss	56	0.3
Wavy dicranum	56	0.2
Pin cushion moss	33	0.8
Shaggy moss	22	2.5
Bryo-Lichen Layer (Mean % Cover)		**25**

Distinguishing Features

This white pine dominated softwood forest usually occurs on drumlins in western Nova Scotia. Balsam fir regeneration is common. Level microtopography and a soil profile that shows a plough layer are good site indicators.

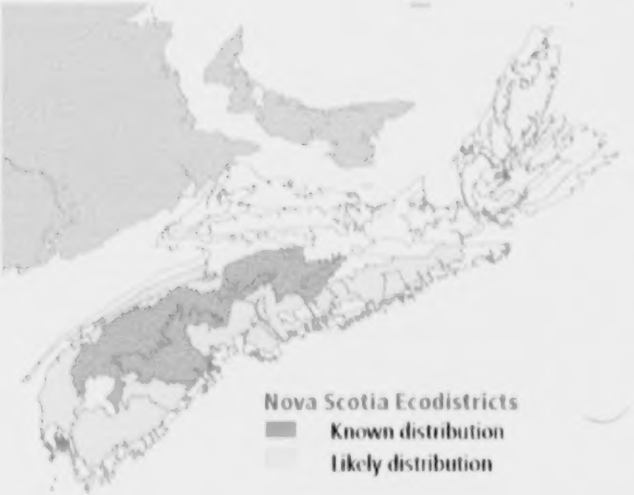
Pine-sap

Site Characteristics

Slope Position: Middle^{3} Upper^{3} Level^{2} Lower^{1} Toe^{1}
Surface Stoniness: (Non - Slightly)^{6} (Moderately)^{4}
Bedrock Outcrop: (Non rocky)^{10}
Elevation Range: 40 - 185m
Slope Gradient: Gentle^{7} Level^{2} Steep^{1}
Aspect: North^{1} East^{4} South^{3} West^{1} None^{1}
Exposure: Moderate^{8} Mod. exposed^{1}
Mod. sheltered^{1}
Microtopography: Level^{4} Moderate^{2} Strongly^{2} Slightly^{1} nd^{1}
Drainage: Well^{5} Moderately well^{4} Imperfect^{1}

Soil Characteristics

Soil Type: ST8^{7} ST2-L^{1} ST9^{1} ST11^{1}
Parent Material: Glacial till^{8} nd^{2}
Rooting Depth (cm): (30-45)^{6} (>45)^{3} nd^{1}
Duff Thickness (cm): (0-5)^{6} (6-10)^{3} nd^{1}



Rory Neils Lake,
Richmond County

OF4

Balsam fir – White spruce / Evergreen wood fern – Wood aster

Abies balsamea – Picea glauca /
Dryopteris intermedia – Aster acuminatus

n=7

Concept: This early to mid-successional Vegetation Type (VT) has an overstory dominated by balsam fir, usually with a strong component of white spruce. This VT is a second generation old field forest which develops from previously harvested or severely disturbed OF1, OF2, OF3 or OF5 stands. Understory flora associated with this VT are more abundant and representative of natural forest conditions than those of other old field forest types. OF4 is found throughout the province, but is mainly associated with previous OF1 (White spruce / Aster – Goldenrod / Shaggy moss) stands.

Vegetation: Balsam fir and white spruce are the dominant overstory trees, while red maple, tamarack and white birch are common associates. The shrub layer is dominated by regenerating trees, especially balsam fir, with lesser red maple, yellow birch and sugar maple. The presence of striped maple and mountain maple indicates a return to more natural vegetation conditions. In the herb layer, fewer of the species indicative of past agricultural land use are found. Instead, evergreen wood fern, wood aster, sarsaparilla and other flora typical of upland forest are more common. Moss cover is variable, with Schreber's moss, stair-step moss and hair-cap moss the main moss species found.

Environmental Setting: OF4 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of variable texture. This VT is found throughout Nova Scotia, but is primarily associated with several Nova Scotia Upland ecodistricts (Cobequid Hills, Cobequid Slopes, Cape Breton Hills, Pictou Antigonish Highlands) and the Atlantic Coastal and Fundy Shore ecoregions. Sites that were tilled or pastured generally have level microtopography and a visible Ap (plough layer) soil horizon.

Successional Dynamics: OF4 is an even-aged, early to mid-successional VT dominated by balsam fir. This VT originates from advanced regeneration established under first generation old field forests (usually old field white spruce). Natural disturbance agents include insects (bark beetles, tussock moth, spruce budworm) and windthrow. Later successional stages will generally include species from the original forest cover, especially if seed sources are nearby. Possible late successional stages include TH1 (Sugar maple / Hay-scented fern), TH2 (Sugar maple / New York fern – Northern beech fern), MW1 (Red spruce – Yellow birch / Evergreen wood fern) and MW3 (Hemlock – Yellow birch / Evergreen wood fern). Stands that slowly deteriorate are more likely to succeed to such forest conditions as shade-tolerant species regenerate on site. Clearcut harvesting may initiate an earlier successional stage dominated by grey birch, pin cherry, aspen, white birch and other woody shrubs.

Ecological Features

This second-growth patch forest follows stand-level disturbances of old field forests (OF1, OF2 and OF3). These disturbances may accelerate succession towards pre-agricultural forest conditions. Past cultivation has leveled most pre-disturbance microtopography, while rock walls and piles, old foundations and wells provide additional evidence of past agricultural land use. Linear rock piles may provide dwellings for rodents, snakes, and insects like wasps and bees. These forests are often close to open fields and farms, and depending on their disturbance history, may contain large white spruce snags and fallen stems. OF4 may attract deer, red fox, coyote, snowshoe hare, red squirrels and pileated woodpeckers. It provides excellent growing conditions for mycorrhizal mushrooms including chanterelle and various boletes.

Characteristic Plants

Characteristic Plants	OF4 Freq. (%)	OF4 Cover (%)
Balsam fir	100	55.2
White spruce	89	20.0
White birch	44	0.8
Red maple	22	6.5
Tamarack	22	4.0
Grey birch	22	1.5
Trembling aspen	11	12.0
Red spruce	11	4.0
Black spruce	11	0.1
Large-tooth aspen	11	0.1
Tree Layer (Mean % Cover)		**78**
Balsam fir	100	2.7
Red maple	56	2.2
Mountain-ash	56	0.1
Yellow birch	33	1.2
Velvet-leaf blueberry	33	0.1
Speckled alder	22	12.5
Mountain maple	22	1.0
Striped maple	22	0.6
Sugar maple	22	0.5
Beaked hazelnut	22	0.3
Fly honeysuckle	22	0.1
Lowbush blueberry	22	0.1
Red raspberry	22	0.1
Wild raisin	22	0.1
Shrub Layer (Mean % Cover)		**8**
Evergreen wood fern	100	2.4
Wild lily of the valley	100	1.6
Bunchberry	89	4.4
Starflower	89	0.3
Sarsaparilla	67	1.4
Wood aster	67	0.2
Goldthread	56	2.4
Dwarf raspberry	44	0.5
Drooping wood sedge	44	0.4
Common speedwell	33	0.7
Bluebead lily	33	0.3
Rough goldenrod	33	0.1
Spinulose wood fern	22	2.6
Twinflower	22	1.0
Bracken	22	0.8
Hay-scented fern	22	0.3
Short husk	22	0.3
Canada goldenrod	22	0.1
Ground pine	22	0.1
New York fern	22	0.1
Violets	22	0.1
Herb Layer (Mean % Cover)		**14**
Schreber's moss	89	34.8
Hair-cap moss	89	3.6
Stair-step moss	67	21.3
Broom moss	67	2.2
Wavy dicranum	44	1.4
Plume moss	44	0.2
Bazzania	22	6.5
Shaggy moss	22	1.0
Bryo-Lichen Layer (Mean % Cover)		**53**

Distinguishing Features

This softwood forest is dominated by balsam fir that usually originates following harvesting of a previous old field forest. Shrubs and herbs tend to be more indicative of natural forest conditions.

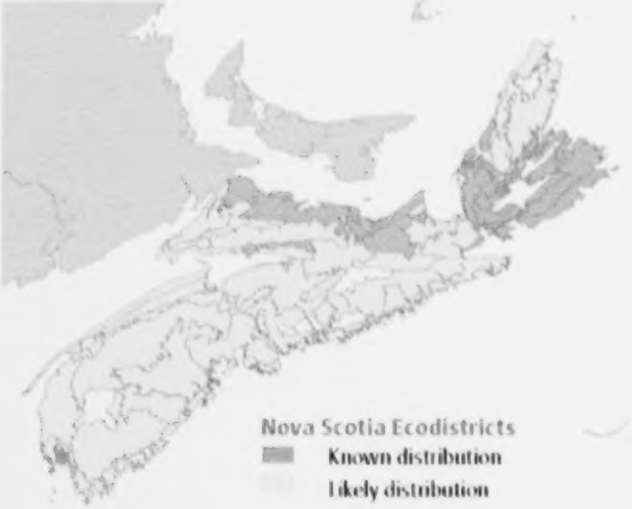
Rock wall
[John Gillis]

Site Characteristics

Slope Position:	Level^{4} Middle^{4} Upper^{2}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	11 – 316m
Slope Gradient:	Gentle^{6} Level^{4}
Aspect:	North^{4} West^{2} None^{4}
Exposure:	Moderate^{6} Exposure^{3} Mod. exposed^{1}
Microtopography:	Slightly^{6} Level^{2} Moderately^{1} Strongly^{1}
Drainage:	Well^{6} Imperfect^{3} Moderately well^{1}

Soil Characteristics

Soil Type:	ST2-L^{6} ST9^{3} ST8^{1}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^{3} (30-45)^{6} (>45)^{1}
Duff Thickness (cm):	(0-5)^{4} (6-10)^{1} (11-20)^{5}



Telford,
Pictou County

OF5

Trembling aspen – Grey birch / Rough goldenrod – Strawberry

Populus tremuloides – Betula populifolia /
Solidago rugosa – Fragaria virginiana

n=11

Concept: This early successional Vegetation Type (VT) has an overstory dominated by trembling aspen and grey birch, with a variety of other associates found with lower canopy abundance. This VT is associated with a range of moisture conditions, but is more common on wetter sites and previously cleared riparian forests. Shrub and herb layers are usually better developed than on other old field sites. OF5 is found scattered throughout the province, but is less common than other first generation old field types (OF1, OF2, OF3).

Vegetation: Trembling aspen and grey birch are the dominant overstory trees, with lesser white birch, red maple, balsam fir and/or black spruce. The well-developed shrub layer includes serviceberry, blackberry, wild raisin, beaked hazelnut and bush honeysuckle accompanied by regenerating trees. Herb layer species are mainly those indicative of past agricultural land use, including strawberry, hawkweeds, goldenrods, asters, common speedwell, buttercups and several grasses and sedges. Leaf litter often dominates the forest floor, thereby limiting bryophyte development (although species richness may be high). Only shaggy moss is occasionally abundant, while sphagnum species can be found on wetter microsites in the stand.

Environmental Setting: OF5 is mainly associated with fresh-moist to moist-wet, nutrient medium to rich soils of fine to medium texture. This VT can be found province-wide, but is most common in lowland ecoregions (Valley and Central Lowlands, Northumberland / Bras d'Or Lowlands). OF5 sites that have been tilled or pastured will also have level microtopography and a distinct Ap (plough layer) soil horizon. This horizon may also be enhanced by active worm activity on these hardwood-dominated sites.

Successional Dynamics: OF5 is an even-aged, early successional VT dominated by trembling aspen and grey birch. Both species are shade-intolerant and have a short lifespan – factors which will eventually lead to the collapse of this ecosystem. Natural disturbance agents include insects and disease (e.g. tent caterpillar, tussock moth, hypoxylon canker) and windthrow. Subsequent successional stages will begin to include species from the original forest cover, especially if suitable seed sources are nearby. Stands that slowly deteriorate are more likely to transition to such forest conditions as shade-tolerant species regenerate on site. Clearcut harvesting may lead to re-establishment of aspen and grey birch along with other pioneer tree species (e.g. pin cherry, white birch, red maple). Depending in part on the level of advanced regeneration at the time of harvest, OF5 may also succeed to OF4 (Balsam fir – White spruce / Evergreen wood fern – Wood aster). Possible late successional stages include TH1 (Sugar maple / Hay-scented fern), TH2 (Sugar maple / New York fern – Northern beech fern), MW1 (Red spruce – Yellow birch / Evergreen wood fern) and MW3 (Hemlock – Yellow birch / Evergreen wood fern).

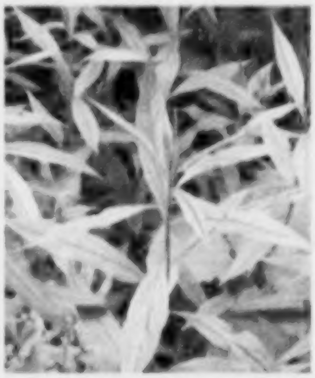
Ecological Features

Past cultivation across this patch forest has leveled most pre-disturbance microtopography, while rock walls and piles, old foundations and wells provide additional evidence of agricultural land use. Linear rock piles may provide dwellings for rodents, snakes, and insects like wasps and bees. Other unique aspects include the forest's close proximity to open fields, active farms, and streams and the frequent presence of apple and other fruit trees. These features may attract deer, red fox, coyote, snowshoe hare, red squirrels, beaver and game birds. Older aspen trees may provide soft snags and cavities for several species of birds, including the pileated woodpecker. Resin from aspen buds is the primary source of bee propolis, an essential hive material.

Characteristic Plants	OFS Freq. (%)	OFS Cover (%)
Trembling aspen	100	46.4
Grey birch	64	24.6
White birch	45	8.2
Red maple	36	13.8
Balsam fir	27	13.3
Black spruce	27	11.7
Large-tooth aspen	18	19.0
White spruce	18	12.5
Red spruce	18	3.5
Tree Layer (Mean % Cover)		**86**
Red maple	73	1.8
Balsam fir	64	6.3
Trembling aspen	64	5.7
White ash	64	0.8
Common blackberry	45	3.1
Serviceberry	45	0.9
Wild raisin	45	0.1
Grey birch	36	1.5
Alternate-leaved dogwood	36	1.4
Beaked hazelnut	36	1.3
Choke cherry	36	0.2
Lowbush blueberry	36	0.1
White spruce	27	3.3
Bush-honeysuckle	27	2.8
Meadow-sweet	27	1.0
White birch	27	0.4
Shrub Layer (Mean % Cover)		**20**
Wild lily-of-the-valley	73	6.6
Starflower	64	0.6
Rough goldenrod	55	16.0
Strawberry	55	1.3
Bunchberry	45	8.2
Sarsaparilla	45	4.3
Tall white aster	45	3.9
Wood aster	45	0.7
Common speedwell	45	0.6
White panicle aster	36	6.4
Calico aster	36	0.9
Cinquefoil	36	0.9
Violets	36	0.2
Yellow hawkweed	27	15.7
New York fern	27	2.7
Hawkweeds	27	2.4
Shinleaf	27	2.0
Common woodrush	27	0.8
Poverty grass	27	0.4
Herb Layer (Mean % Cover)		**44**
Schreber's moss	73	3.8
Broom moss	73	0.5
Shaggy moss	64	14.1
Hair-cap moss	55	1.8
Stair-step moss	36	2.1
Plume moss	36	0.5
Hypnum moss	36	0.3
Fern moss	27	2.7
Ladies' tresses	27	1.0
Wavy dicranum	27	1.0
Atrichum moss	27	0.1
Bryo-Lichen Layer (Mean % Cover)		**16**

Distinguishing Features

A forest, dominated by trembling aspen with a lesser, but significant, component of grey and sometimes white birch, on abandoned agricultural lands. Asters and goldenrods are typical. Evidence of old field includes rock foundations, rock piles, rock walls and wire fencing. Sites typically have level microtopography and a soil profile that shows a plough layer.



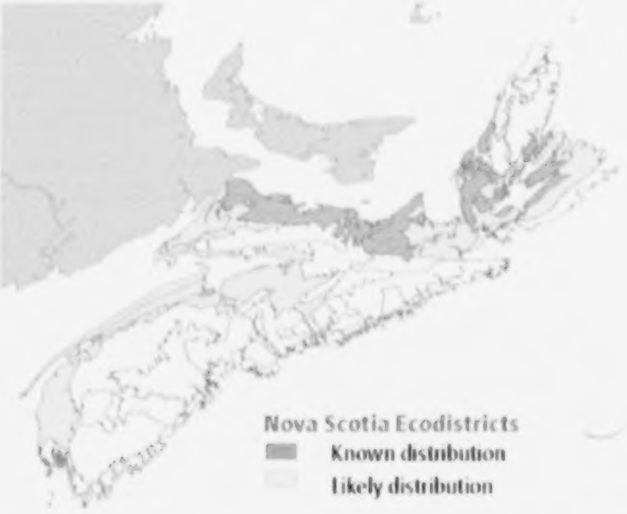
Asters spp

Site Characteristics

Slope Position: Level^{6} Upper^{2} Middle^{1} Toe^{1}
Surface Stoniness: (Non - Slightly)^{10}
Bedrock Outcrop: (Non rocky)^{10}
Elevation Range: 4 - 130m
Slope Gradient: Gentle^{5} Level^{5}
Aspect: North^{1} South^{3} West^{2} None^{4}
Exposure: Moderate^{9} Mod. exposed^{1}
Microtopography: Level^{6} Slightly^{2} Moderate^{1} Severely^{1}
Drainage: Imperfect^{4} Moderately well^{3} Poor^{2} Well^{1}

Soil Characteristics

Soil Type: ST7^{2} ST8^{2} ST12^{2} ST2-L^{1} ST3^{1} ST9^{1} ST11^{1}
Parent Material: Glacial till^{8} Alluvium^{1} Colluvium^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{5} (>45)^{4}
Duff Thickness (cm): (0-5)^{6} (6-10)^{1} (11-20)^{1} nd^{2}



OW Open Woodland Group

(n = 60)

OW1 Jack pine / Huckleberry / Black crowberry / Reindeer lichen
OW2 Black spruce / Lambkill / Reindeer lichen
OW3 Red spruce / Red-berried elder / Rock polypody
OW4 Red pine – White pine / Broom crowberry / Grey reindeer lichen
OW5 Red oak / Huckleberry / Cow-wheat – Rice grass / Reindeer lichen
OW6 White birch – Red oak – White ash / Marginal wood fern – Herb-Robert

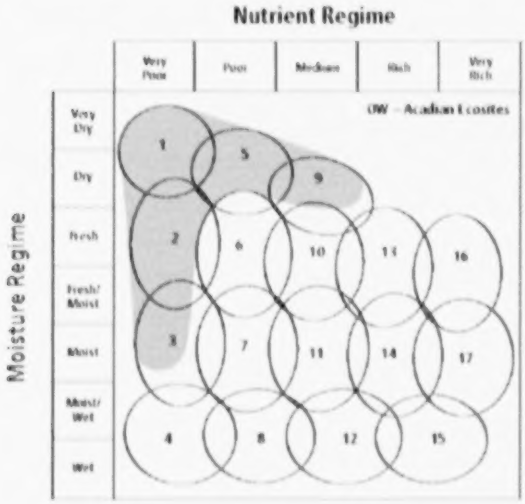
Concept: These are open woodlands ecosystems usually with tree coverage less than 30%. They occur on a variety of sites where growth and density are limited by low fertility, lack of moisture, thin soils and/or exposed bedrock. Stunted tree growth, a well developed shrub layer, and at times extensive coverage of reindeer lichens (*Cladina spp.*) are typical for this group. All Vegetation Types (VT) in this group are found in the Acadian Ecosite group, with some also found in the Maritime Boreal Ecosite group.

Vegetation: Pine, black spruce, red maple and red oak are common trees associated with this group. Huckleberry, lambkill, rhodora, blueberry and wild raisin often dominate the shrub layer. Dwarf heaths are also common including broom crowberry and black crowberry. The herb layer is often poorly developed but can include bracken, cow-wheat, rice grass and poverty grass. Common lichens include grey reindeer lichen, green reindeer lichen and star-tipped reindeer lichen.

Environmental Setting/ Site Conditions: Vegetation types in this group are found on bedrock outcrops, shallow glacial tills, colluvium and sandy outwash plains. Soils are usually dry and nutrient poor, but some sites fall outside of these norms. Vegetation types form small patches on the landscape. This group is found throughout mainland Nova Scotia and is scattered in Cape Breton.

Successional Dynamics: Open woodlands are mainly edaphic climax associations limited by low moisture, exposure and nutrient poor soils. Windthrow and fire are the main natural disturbance agents. Stands within a given VT may display a range of development stages depending on disturbance history and natural senescence.

Edatopic Grids


Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
OW – Acadian Ecosites
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
Wet
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5
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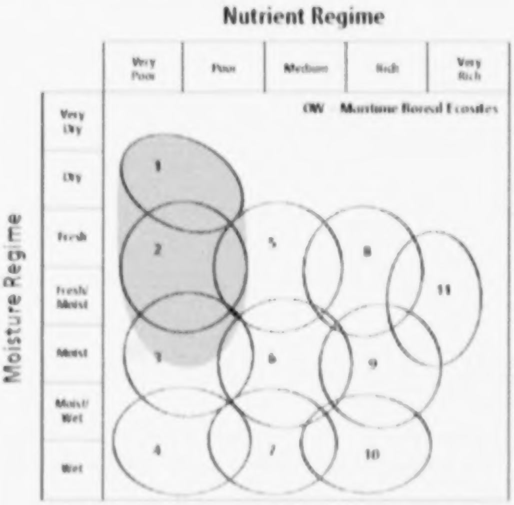

Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
OW – Maritime Boreal Ecosites
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
Wet
1
2
5
8
11
3
6
9
4
7
10

Ecological Features

Woodlands generally occur in conditions which are too harsh to support full canopy forests and their associated species. These small patch ecosystems are usually found on sharp crests and ridges, cliffs, rocky outcrops and slopes and/or sand flats. Sites often have thin, droughty, very stony or sandy soils and may have high bedrock exposure. Stands are typically stunted and/or open featuring species tolerant of low moisture, reduced soil accumulation and climatic extremes. High reindeer lichen cover is a characteristic feature, except on talus (units OW3 and OW6), taking decades to dominate ground cover. Habitat values vary considerably among units. For example, talus forests can support several uncommon small mammal and land snail species. Boreal and subarctic plants are associated with cooler woodlands, while inland and some types of coastal woodlands may support upland Atlantic Coastal plain species. Most of this group are unlikely to support old growth, however they may exhibit long term ecological continuity.

Blandford,
Lunenburg County

OW1

Jack Pine / Huckleberry / Black crowberry / Reindeer lichen

Pinus banksiana / Gaylussacia baccata / Empetrum nigrum / Cladina spp.

n=8

Concept: This open coniferous woodland is characterized by jack pine canopy dominance, thin acidic soils and prominent reindeer lichen, black crowberry and huckleberry cover. It is found on exposed rock ridges or thin glacial till, where it may co-occur with SP1 (Jack pine / Bracken – Teaberry forest). OW1 is typically on very dry to dry sites, but occasionally occurs on moister soil, usually with thicker organic layers.

Vegetation: The canopy has low to moderate crown closure and is usually dominated by jack pine or co-dominated by jack pine and black spruce. Few other tree species are represented. The very well-developed woody understory features high huckleberry cover, with lesser but frequent rhodora, lambkill and low bush blueberry. Herb cover and species richness is reduced, although dwarf heaths like black crowberry and less often, broom crowberry, are characteristic, especially in coastal areas. The dense lichen layer is characterized by grey, green, lesser green and star-tipped reindeer lichen species.

Environmental Setting: This low elevation ecosystem is found in areas where thin acidic soils, exposed bedrock and cool climatic conditions limit plant productivity and species richness. It occurs on upper slopes and crests of rocky hill crests and ridges, and on flatter, usually thin, glacial deposit. Soils are usually dry, nutrient very poor, coarse textured and stony. Microtopography is reduced, while site exposure is very high. The ecosystem occurs in the Atlantic Coastal and Eastern ecoregions, with outliers on the coastal fringe of the Cape Breton Highlands. This relatively uncommon Vegetation Type (VT) is also rare in New Brunswick. It isn't known from anywhere else in Canada.

Successional Dynamics: The Jack pine / Huckleberry / Black crowberry / Reindeer lichen woodland is expressed as an early successional stage, but is not expected to advance to later successional stages. Shallow, nutrient very poor soils and exposure generally prevent the transition to other pine or black spruce vegetation types. The VT persists as an edaphic climax but is also strongly shaped by harsh climatic factors (e.g. strong desiccating (drying) winds, cool temperatures and sometimes salt spray). Fire is a component of stand history in some stands but is not required for ecosystem persistence, because serotinous (refers to cones which remain closed until opened by excessive heat, usually from fires) jack pine cones often open and release seed without fire in these woodlands. Other disturbances include windthrow and breakage.

Ecological Features

This nationally unique, range-limited ecosystem is one of the least common VTs, largely isolated to cool dry ridges and hill tops. These sites are somewhat prone to lightning strikes that may help maintain jack pine dominance. The rocky woodland's most remarkable features include its rarity, restricted distribution, and relatively specific environmental requirements. These collectively contribute to OW1's high vulnerability, presenting unique conservation challenges. The Jack pine / Huckleberry / Black crowberry / Reindeer lichen woodland supports uncommon habitat conditions, but associated animal and lichen species are undocumented. This small patch ecosystem may provide plant habitat for mountain sandwort, red crowberry and a small group of flora with Atlantic Coastal Plain affinities (e.g. inkberry, broom crowberry and pine barren goldenheather). It supports an open, sometimes stunted, canopy with abundant shrub and lichen cover. Productivity, tree age, canopy height and old growth potential are all low.

Characteristic Plants	OW1	
	Freq. (%)	Cover (%)
Jack pine	88	21.9
Black spruce	88	3.7
Red maple	38	6.0
Tamarack	25	1.5
Hemlock	13	3.0
White pine	13	0.1
Tree Layer (Mean % Cover)		**25**
Huckleberry	100	36.9
Lambkill	100	8.5
False holly	88	4.0
Lowbush blueberry	75	5.5
Wild raisin	75	1.5
Serviceberry	75	0.4
Rhodora	63	9.3
Jack pine	63	4.4
Red maple	63	0.4
Black spruce	50	5.9
Chokeberries	50	1.1
White pine	38	1.3
Downy alder	38	1.2
Common blackberry	25	2.5
Velvet-leaf blueberry	25	0.8
Sweet gale	25	0.3
Ground juniper	25	0.1
Shrub Layer (Mean % Cover)		**70**
Teaberry	100	4.1
Bracken	88	12.7
Black crowberry	88	10.4
Mayflower	63	0.8
Bunchberry	50	3.9
Wild lily-of-the-valley	50	0.8
Starflower	50	0.1
Three-toothed cinquefoil	38	1.7
Poverty grass	38	1.0
Pink lady's slipper	38	0.1
Mountain sandwort	25	0.1
Ground pine	25	0.1
Cow-wheat	25	0.1
White-haired panic grass	25	0.1
Herb Layer (Mean % Cover)		**29**
Grey reindeer lichen	88	24.3
Schreber's moss	75	20.0
Star-tipped reindeer lichen	63	3.0
Wavy dicranum	63	1.4
Broom moss	50	0.4
Ladies tresses	50	0.3
Dicranums	38	0.5
Cup lichens	25	1.5
Hair-cap moss	25	0.5
Sphagnum tenellum	25	0.1
Bazzania	25	0.1
Bryo-Lichen Layer (Mean % Cover)		**43**

Distinguishing Features

A woodland characterized by scattered jack pine, exposed bedrock and prominent reindeer lichen, black crowberry and huckleberry cover.

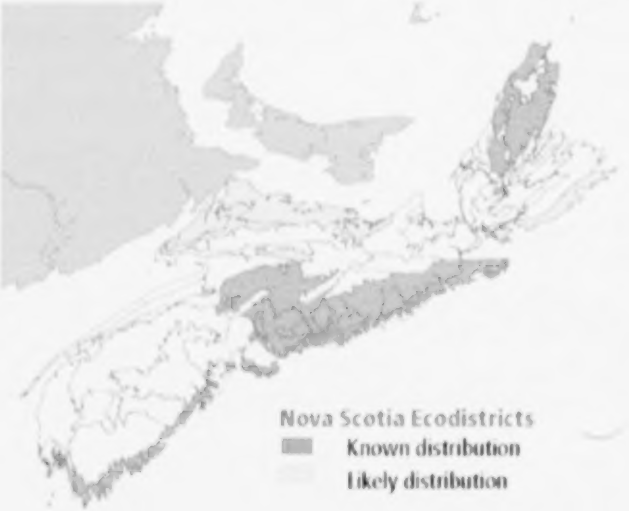
Black crowberry

Site Characteristics

Slope Position:	Crest^{5} Level^{1} Upper^{1} Middle^{1}
Surface Stoniness:	(Non - Slightly)^{6} (Very - Excessively)^{1} nd^{1}
Bedrock Outcrop:	(Very - Excessively)^{6} (Slightly - Moderately)^{1} nd^{1}
Elevation Range:	22 - 108m
Slope Gradient:	Level^{6} Gentle^{1} nd^{1}
Aspect:	South^{1} West^{1} None^{6}
Exposure:	Exposed^{5} Other^{2} nd^{1}
Microtopography:	Level^{6} Slightly^{1} nd^{1}
Drainage:	Rapid^{5} Imperfect^{1} Moderately well^{1} nd^{1}

Soil Characteristics

Soil Type:	ST15^{4} ST2^{1} ST6^{1} ST15-G^{1} ST16^{1}
Parent Material:	Bedrock^{5} Glacial till^{1} Organic/Bedrock^{1} Till/Bedrock^{1}
Rooting Depth (cm):	(<30)^{5} (30-45)^{1} nd^{2}
Duff Thickness (cm):	(6-10)^{5} (11-20)^{2} nd^{1}



Riversdale,
Colchester County

OW2

Black spruce / Lambkill / Reindeer lichen

Picea mariana / Kalmia angustifolia / Cladina spp.

n=28

Concept: The Black spruce / Lambkill / Reindeer lichen woodland is found on acidic rock outcrops and thin glacial soils. This coniferous ecosystem is characterized by its open black spruce canopy, very poor soils, low productivity and prominent representation of reindeer lichens.

Vegetation: The open canopy is dominated by black spruce or co-dominated by black spruce and pine (white or red). Other tree species are uncommon. The well-developed woody understory is comprised of acid tolerant shrubs (e.g. lambkill, low bush blueberry and wild raisin). Species usually found on moist soils (e.g. rhodora and false holly) are supported by surface peat deposits found over mineral soil or in cracks and depressions of exposed bedrock. Herbaceous species richness and abundance is reduced. Reindeer lichens (usually grey and/or lesser green) are frequent and usually abundant. In some occurrences, bryophyte cover is higher than lichen cover.

Environmental Setting: OW2 is associated with dry to moist, nutrient very poor soils that are often shallow to bedrock and/or stony. The low elevation ecosystem is found on rocky outcrops or on shallow glacial tills. Soil moisture increases with organic accumulation, particularly where near-surface bedrock is present or cemented (orstein) soil horizons reduce drainage. Site exposure is moderate to high, while surface microtopography and stoniness is low. It occurs throughout the province but is especially common in the Eastern and Western ecoregions. OW2 is uncommon but widespread across the Maritimes. Although this Vegetation Type (VT) is similar to boreal lichen woodlands from eastern Canada, it is considered nationally distinct.

Successional Dynamics: This early successional ecosystem is largely maintained by exposure and limiting soil conditions. It will not succeed to latter successional stages (e.g. other black spruce or pine vegetation types) and is considered a type of edaphic climax. Possible disturbances include fire, windthrow and breakage. Black spruce will regenerate on OW2 sites by seed and/or layering. Most stands have uneven age class structures.

Ecological Features

The Black spruce / Lambkill / Reindeer lichen is unique to the east coast, occurring as a small patch ecosystem in each of the four Atlantic Provinces. This relatively rare woodland has strong boreal affinity, but the presence of northern temperate species (e.g. huckleberry, rhodora and chokeberry, among others) differentiates the VT from its boreal analogs in Quebec and Ontario. Limited distribution in Nova Scotia may present a conservation challenge. This ecosystem supports unique habitat conditions, but associated animal, plant and lichen species are undocumented. It typically features a very open canopy, and high shrub and lichen cover. Productivity, tree age, canopy height and old growth potential are all low.

Characteristic Plants	OW2	
	Freq. (%)	Cover (%)
Black spruce	96	14.3
White pine	46	4.8
Tamarack	29	4.4
Balsam fir	25	2.4
Red pine	21	7.8
Grey birch	14	5.5
Red maple	14	3.8
White birch	7	3.5
Red spruce	7	3.0
White spruce	4	8.0
Heart-leaf birch	4	3.0
Red oak	4	2.0
Large-tooth aspen	4	0.1
Tree Layer (Mean % Cover)		**22**
Lambkill	96	24.5
Wild raisin	96	1.8
Black spruce	89	15.9
False holly	82	3.3
Red maple	68	3.7
Velvet-leaf blueberry	64	5.3
Rhodora	61	6.3
Serviceberry	57	0.2
Huckleberry	54	25.5
Lowbush blueberry	50	10.3
Balsam fir	43	2.0
Grey birch	39	3.8
Labrador tea	36	8.6
White pine	25	3.2
Ground juniper	25	2.3
Chokeberries	25	0.2
Mountain-ash	21	0.1
Shrub Layer (Mean % Cover)		**78**
Teaberry	86	4.2
Bracken	75	12.2
Bunchberry	64	2.2
Mayflower	50	0.6
Pink lady's slipper	46	0.2
Starflower	36	0.5
Wild lily-of-the-valley	36	0.2
Black crowberry	29	18.1
Creeping snowberry	29	0.7
Cow-wheat	21	0.2
Herb Layer (Mean % Cover)		**21**
Grey reindeer lichen	100	22.2
Schreber's moss	89	31.9
Star-tipped reindeer lichen	64	6.0
Wavy dicranum	50	3.2
Ladies tresses	46	11.1
Cup lichens	39	0.5
Green reindeer lichen	32	8.3
Broom moss	32	1.5
Hair-cap moss	32	0.8
Bazzania	21	6.8
Bryo-Lichen Layer (Mean % Cover)		**69**

Distinguishing Features

This woodland is characterized by scattered black spruce, and sometimes, white or red pine, exposed bedrock, stony and/or shallow soils and prominent reindeer lichen.

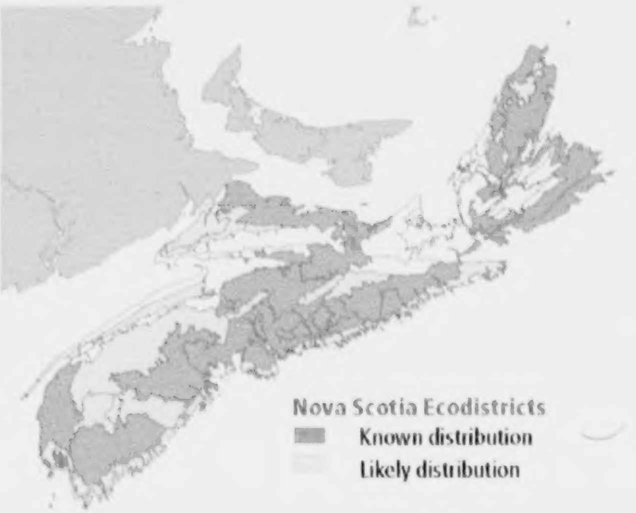
Reindeer lichen

Site Characteristics

Slope Position:	Level^{5} Crest^{3} Other^{2}
Surface Stoniness:	(Non - Slightly)^{6} (Very - Excessively)^{3} (Moderately)^{1}
Bedrock Outcrop:	(Non-Rocky)^{5} (Very - Excessively)^{4} (Slightly - Moderately)^{1}
Elevation Range:	9 - 327m
Slope Gradient:	Level^{7} Gentle^{1} Moderate^{1} nd^{1}
Aspect:	West^{1} None^{8} Other^{1}
Exposure:	Moderate^{6} Exposed^{2} Other^{2}
Microtopography:	Level^{8} Slightly^{1} Moderately^{1}
Drainage:	Imperfect^{3} Rapid^{3} Well^{3} Other^{1}

Soil Characteristics

Soil Type:	ST15^{3} ST3^{2} ST1^{1} ST2-G^{1} ST16^{1} Other^{2}
Parent Material:	Glacial till^{6} Till/Bedrock^{2} Glaciofluvial^{1} Organic/Bedrock^{1}
Rooting Depth (cm):	(<30)^{5} (30-45)^{2} (>45)^{1} nd^{2}
Duff Thickness (cm):	(6-10)^{3} (11-20)^{4} nd^{3}



Cheticamp River Valley, Cape Breton Highlands National Park, Inverness County

OW3

Red spruce / Red-berried elder / Rock polypody

Picea rubens / Sambucus racemosa / Polypodium virginianum

n=3

Concept: This somewhat uncommon woodland is characterized by its open coniferous canopy, low species richness and unique talus substrate. It is found only in areas where topography and bedrock outcropping allow the formation of talus slopes. Sites often contain only patches of vegetation across a broader talus matrix. Red spruce, black spruce and/or hemlock are common canopy dominants, and the understory is similarly variable. OW3 is comparable to OW6 (White birch – Red oak – White ash / Marginal wood fern – Herb-Robert), but is generally associated with less fertile substrates.

Vegetation: The poorly-developed canopy may be dominated by a number of evergreen tree species, but sampled stands support high levels of red spruce or hemlock. Understory associates include vascular plants common to acidic conifer forest and/or rocky substrates (e.g. foxberry, rock polypody, marginal wood fern), but most of these species are infrequent. Bryophyte cover is usually low. On older sites, shrubs and bryophytes may form a mat over underlying talus.

Environmental Setting: This ecosystem is found on talus deposits. On steeper grades and/or upper slope positions, talus can be unstable, but older downslope deposits are less mobile and more suitable for plant growth. Trees and other plants are sometimes rooted in underlying mineral soil, but more often in pockets of organic matter and weathered rock found among surface rock fragments. Mineral soil (if present) is usually acidic and dry. Exposure is moderate to extreme. Most occurrences are in the Cape Breton Highlands and Nova Scotia Uplands ecoregions. The Vegetation Type (VT) is scattered across New Brunswick.

Successional Dynamics: This ecosystem is an early to mid-successional stage, but mechanisms for establishment and renewal of this VT are not well understood. As soils deepen over talus, the ecosystem will advance to include features more typical of upland conifer forest, but their expression will be weakened by inherent soil stoniness and related restrictions in rooting potential and nutrient availability.

Ecological Features

Softwood talus woodlands are uncommon small patch ecosystems that are both under sampled and poorly understood in Nova Scotia. Plots were established in warmer areas of the province, where temperate flora are more common. Stronger boreal expressions are expected in cooler areas of Cape Breton. Red spruce / Red berried elder / Rock polypody woodland supports remarkably unique habitat conditions, but most associated animal, plant and lichen species are undocumented. Exceptions include the rock vole, Gaspé and long tailed shrews, and various land snails. Canopy closure is variable but stand structures tend to be complex, supporting diverse microhabitats. The ecosystem has moderate potential to develop old growth where slopes have stabilized.

Characteristic Plants	OW3 Freq. (%)	OW3 Cover (%)
Red spruce	67	37.0
Hemlock	67	16.0
White birch	67	3.5
Red maple	67	2.0
Balsam fir	33	11.0
Black spruce	33	10.0
Yellow birch	33	5.0
White pine	33	5.0
Beech	33	2.0
Sugar maple	33	1.0
Ironwood	33	1.0
Tree Layer (Mean % Cover)		**51**
Red-berried elder	67	3.5
Velvet-leaf blueberry	67	2.0
Balsam fir	67	1.5
Red spruce	33	6.0
False holly	33	5.0
Red raspberry	33	4.0
Striped maple	33	3.0
Hemlock	33	3.0
White pine	33	2.0
Serviceberry	33	1.0
Beaked hazelnut	33	1.0
Labrador tea	33	1.0
Fly-honeysuckle	33	1.0
Red oak	33	1.0
Lowbush blueberry	33	1.0
Shrub Layer (Mean % Cover)		**14**
Rock polypody	67	1.5
Foxberry	33	10.0
Marginal wood fern	33	5.0
Creeping snowberry	33	3.0
Sarsaparilla	33	2.0
Common hair grass	33	2.0
Spinulose wood fern	33	2.0
Teaberry	33	2.0
White goldenrod	33	2.0
Rough goldenrod	33	1.0
Starflower	33	1.0
Poverty grass	33	0.5
Umbel-like sedge	33	0.1
Herb Layer (Mean % Cover)		**11**
Cup lichens	100	1.7
Grey reindeer lichen	67	6.0
Schreber's moss	67	5.5
Pin cushion moss	67	0.8
Green reindeer lichen	33	1.0
Juniper polytrichum	33	1.0
Bazzania	33	1.0
Wavy dicranum	33	0.5
Stair-step moss	33	0.5
Hair-cap moss	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**11**

Distinguishing Features

This softwood woodland of spruce and hemlock occurs on talus slopes. Rock polypody is common.

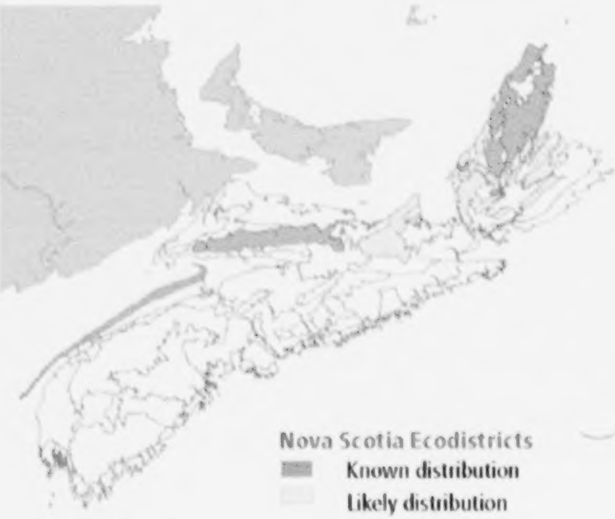
Talus slope, CBHNP
(Envirofoto)

Site Characteristics

Slope Position:	Crest[3] Middle[1] Upper[3]
Surface Stoniness:	(Very - Excessively)[10]
Bedrock Outcrop:	nd[10]
Elevation Range:	150 - 220m
Slope Gradient:	Moderate[7] nd[3]
Aspect:	South[7] nd[3]
Exposure:	Mod. exposed[7] nd[3]
Microtopography:	nd[10]
Drainage:	nd[10]

Soil Characteristics

Soil Type:	nd[10]
Parent Material:	Colluvium[10]
Rooting Depth (cm):	(<30)[7] nd[3]
Duff Thickness (cm):	nd[10]


Nova Scotia Ecodistricts
▨ Known distribution
▢ Likely distribution

*Hibernia,
Queens County*

OW4

Red pine – White pine / Broom crowberry / Grey reindeer lichen

Pinus resinosa – Pinus strobus / Corema conradii / Cladina rangiferina

n=13

Concept: This sparsely treed coniferous woodland is a transitional successional stage, encompassing species of both open heathland and closed canopy pine forest usually SP2 (Red pine / Blueberry / Bracken). The ecosystem is characterized by low crown closure, frequent red pine, and high broom crowberry cover; reindeer lichens are abundant in some occurrences. The Red pine – White pine / Broom crowberry / Grey reindeer lichen woodland is found on dry sandy or coarse loamy soils with low humus accumulation and reduced nutrient availability. Many occurrences originate with fire.

Vegetation: The open evergreen canopy is dominated by red pine and/or white pine, but the latter condition is less common. On somewhat moister soils, black spruce and/or larch may be prominent, while pine is absent or sparse. Deciduous tree species may be found scattered but most are uncommon. Non-native trees species (e.g. Scotch pine, Black locust) are rapidly spreading in some occurrences and threatening ecosystem persistence. Lower strata are dominated by low shrubs. Broom crowberry is abundant in all occurrences but is typically excluded under denser tree crowns. Herbaceous cover is reduced except near exposed sand and around disturbed sites (i.e. often caused by all-terrain vehicle traffic). Forest species (e.g. wild lily-of-the-valley, starflower, pink lady's slipper, bluebead lily and checkered rattlesnake plantain) occur under tree or tall shrub cover. Reindeer lichen abundance is moderate to high.

Environmental Setting: OW4 is mainly found on dry, sandy, nutrient very poor soils associated with glaciofluvial deposits or shallow, gravelly and/or coarse textured glacial tills. Most soils are deep and well drained but the presence of cemented (orstein) soil horizons in some sites can impede drainage and increase available moisture in the rooting zone. This Vegetation Type (VT) is found in warmer areas and is excluded from the coast. It is found in the Valley and Central Lowlands and Western ecoregions. This VT is nationally, if not globally, unique. It is not found outside Nova Scotia.

Successional Dynamics: This is an early successional woodland community. It is the first treed successional stage expressed in broom crowberry heathland on mainland Nova Scotia. The ecosystem often occurs on the edges of open barrens as a transition to closed forest. In other sites, trees may be more evenly and widely scattered. Fire is a component of stand history in most occurrences, but long-standing fire suppression programs have promoted higher tree presence, contributing to the loss of open broom crowberry heathland. In the absence of fire or other disturbances, the woodland will succeed to SP2 (Red pine / Blueberry / Bracken).

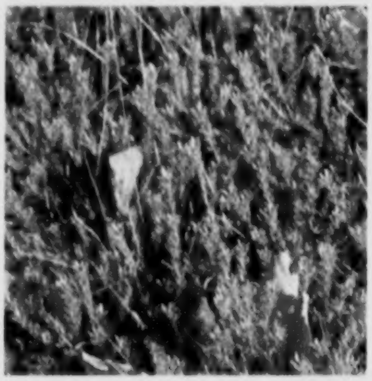
Ecological Features

Global occurrences of this provincially uncommon ecosystem are limited to Nova Scotia. The often sandy small patch woodland's most remarkable features include its rarity, restricted distribution, and relatively specific environmental requirements (including a potential dependency on fire for establishment and maintenance). These collectively contribute to OW4's high vulnerability, which presents unique conservation challenges. Unlike some of the other rare woodlands in Nova Scotia (e.g. OW1, OW2 and OW5) many occurrences of this ecosystem are critically threatened by human activities, including aggregate mining, commercial and residential development, fire suppression and some types of logging. OW4 supports extraordinarily unique habitat conditions, but most associated species are undocumented. Some exceptions include: vesper sparrow, arrowleaved violet, Case's ladies' tresses, Canada mountain-ricegrass, rock-rose, pine barren goldenheather and dixie reindeer lichen. Many of these are species of high conservation concern.

Characteristic Plants	OW4	
	Freq. (%)	Cover (%)
Red pine	75	13.8
White pine	67	9.1
Grey birch	58	5.3
Black spruce	50	9.5
Tamarack	17	2.5
Red oak	17	2.1
Scotch pine	8	10.0
Red maple	8	3.0
Smooth serviceberry	8	2.0
Pin cherry	8	1.0
Jack pine	8	0.1
Black cherry	8	0.1
Tree Layer (Mean % Cover)		**26**
Broom crowberry	100	61.3
Lowbush blueberry	100	3.3
Lambkill	75	9.2
Black spruce	67	3.1
White pine	67	2.5
Sweetfern	67	0.8
Grey birch	58	2.5
Red pine	58	1.7
Ground juniper	42	1.0
Smooth serviceberry	42	0.6
Wild raisin	42	0.6
Huckleberry	33	2.9
Rhodora	33	1.3
Bayberry	25	5.0
Tamarack	25	1.1
Red maple	25	0.9
Inkberry	25	0.2
Black cherry	25	0.1
Shrub Layer (Mean % Cover)		**80**
Bracken	75	3.5
Teaberry	75	1.2
Bearberry	67	14.4
Umbel-like sedge	50	0.4
Old-field goldenrod	50	0.4
Common hair grass	50	0.3
Starflower	50	0.1
Ground cedar	42	0.3
Hudsonia	42	0.1
Cow wheat	33	0.4
Lions paw	33	0.3
White goldenrod	33	0.2
Wild lily-of-the-valley	33	0.1
Hair fescue	25	0.2
Rice grass	25	0.1
Kentucky bluegrass	25	0.1
Herb Layer (Mean % Cover)		**16**
Grey reindeer lichen	100	11.7
Schreber's moss	67	1.1
Star-tipped reindeer lichen	58	3.9
Green reindeer lichen	33	1.5
Juniper polytrichum	33	0.8
Hair-cap moss	33	0.3
Bryo-Lichen Layer (Mean % Cover)		**16**

Distinguishing Features

This softwood woodland is characterized by open growing red pine. Broom crowberry is abundant but is typically excluded under denser tree crowns. Soils are very dry and sandy. Reindeer lichen can be extensive.



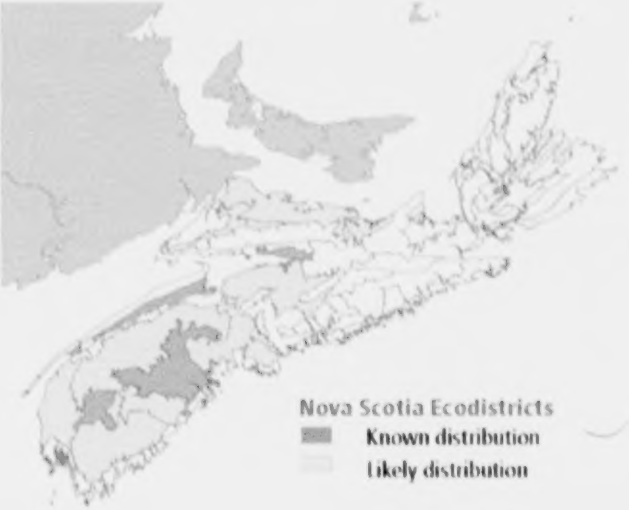
Broom crowberry

Site Characteristics

Slope Position:	Level^{8} Middle^{3} Upper^{1}
Surface Stoniness:	(Non – Slightly)^{4} (Very – Excessively)^{7} (Moderately)^{1} nd^{1}
Bedrock Outcrop:	(Non-rocky)^{5} (Very – Excessively)^{1} nd^{6}
Elevation Range:	10 – 140m
Slope Gradient:	Level^{8} Gentle^{2}
Aspect:	South^{1} None^{8} nd^{3}
Exposure:	Moderate^{4} Mod. exposed^{1} nd^{7}
Microtopography:	Level^{3} Slightly^{2} Moderately^{1} nd^{6}
Drainage:	Well^{4} Rapid^{7} nd^{1}

Soil Characteristics

Soil Type:	ST1^{4} ST15^{2} nd^{6}
Parent Material:	Glaciofluvial^{8} Glacial till^{2}
Rooting Depth (cm):	(<30)^{2} (30–45)^{2} (>45)^{1} nd^{7}
Duff Thickness (cm):	(6–10)^{3} (11–20)^{2} nd^{7}



Moses Mountain,
Hants County

OW5

Red oak / Huckleberry / Cow-wheat – Rice grass / Reindeer lichen

Quercus rubra / Gaylussacia baccata / Melampyrum lineare – Oryzopsis asperifolia / Cladina spp.

n=3

Concept: This relatively uncommon ecosystem develops on acidic glacial soil and or exposed bedrock. It is characterized by an open canopy of red oak and by dense huckleberry cover. The ecosystem has been called a wooded barren or savanna, and is often found in areas where there is an abrupt change in relief. Many occurrences are adjacent to lakes or on steep ridges or sharply rounded crests.

Vegetation: Red oak and lesser red maple dominate the open deciduous canopy. In southwestern Nova Scotia, black cherry may be a frequent but minor component of stand structure. The well-developed understory usually includes abundant huckleberry, although lambkill cover may be relatively abundant in some occurrences. Other important shrubs include witch-hazel, lowbush blueberry and wild raisin. Herbaceous species abundance and richness is reduced, but species characteristic of open dry forest (e.g. bracken, mayflower, cow-wheat, rice grass) are well represented. Reindeer lichens are abundant in some occurrences.

Environmental Setting: The OW5 ecosystem may occur on rock ridges but most occurrences are on upper slopes and crests of thin glacial deposits. Sites have high exposure and moderate to high surface stoniness; microtopography is low. This Vegetation Type (VT) is found across the Western ecoregion and in parts of the Annapolis Valley ecodistrict. OW5 is often found interspersed with IH2 (Red oak – Red maple / Witch-hazel). The VT is also scattered across southern and eastern New Brunswick.

Successional Dynamics: The woodland occurs as an early to mid-successional phase. General successional relationships are poorly understoodl, but the ecosystem is expected to persist as an edaphic climax, because dry, nutrient very poor soils generally prevent succession to other VTs. The woodland is maintained by tree senescence and windthrow, but many occurrences, particularly those on glacial soils, originate with fire.

Ecological Features

Red oak / Huckleberry / Cow-wheat – Rice grass / Reindeer lichen woodlands are under sampled and poorly understood in Nova Scotia. This small patch ecosystem is one of our most temperate woodlands. It is somewhat uncommon in Nova Scotia, and much rarer in New Brunswick. Analyses of eastern Canadian forests and woodlands have not yet addressed this VT, but early comparisons indicate the ecosystem may be restricted to the Maritimes, presenting important conservation challenges.

This ecosystem supports unique habitat conditions, but associated animal, plant and lichen species are undocumented. It typically features a very open canopy and high shrub and lichen cover. Productivity, tree age, canopy height and old growth potential are all low.

Characteristic Plants	OWS Freq. (%)	OWS Cover (%)
Red oak	100	30.7
Red maple	67	15.0
White pine	33	5.0
White spruce	33	2.0
Large tooth aspen	33	0.1
Tree Layer (Mean % Cover)		**43**
Red maple	100	9.0
Red oak	100	8.2
Witch hazel	100	5.8
Velvet-leaf blueberry	100	4.3
Huckleberry	67	63.5
Lambkill	67	8.5
Lowbush blueberry	67	7.0
Black spruce	67	4.5
White pine	67	4.5
White spruce	67	4.0
Wild raisin	67	1.3
Striped maple	33	9.0
White birch	33	7.0
Balsam fir	33	2.1
Red spruce	33	2.0
Serviceberry	33	1.0
Sweetfern	33	0.3
Staghorn sumac	33	0.3
Grey birch	33	0.1
Bush honeysuckle	33	0.1
White ash	33	0.1
Ground juniper	33	0.1
Hemlock	33	0.1
Shrub Layer (Mean % Cover)		**79**
Bracken	100	9.0
Sarsaparilla	100	1.8
Starflower	100	0.2
Teaberry	67	8.3
Bunchberry	67	4.0
Cow-wheat	67	1.0
Wood aster	67	0.3
Poverty grass	67	0.3
Wild lily-of-the-valley	67	0.2
Pink lady's slipper	67	0.1
Rice grass	67	0.1
Mayflower	33	1.0
Evergreen wood fern	33	0.2
Marginal wood fern	33	0.1
Herb Layer (Mean % Cover)		**22**
Grey reindeer lichen	100	10.3
Schreber's moss	100	4.8
Hypnum moss	67	9.0
Star-tipped reindeer lichen	67	3.5
Green reindeer lichen	67	1.5
Wavy dicranum	67	1.0
Broom moss	33	10.0
Hair-cap moss	33	1.0
Cup lichens	33	0.5
Bazzania	33	0.5
Bryo-Lichen Layer (Mean % Cover)		**29**

Distinguishing Features

Red oak is diagnostic of this hardwood woodland, often with red maple, exposed bedrock and prominent reindeer lichen and huckleberry cover. Witch-hazel is common.

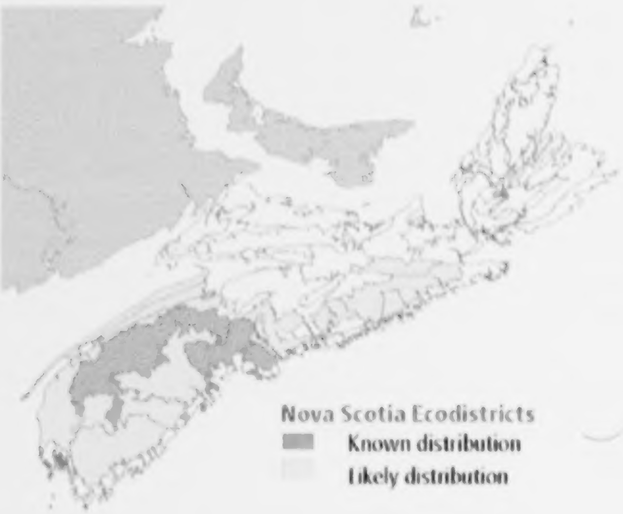
Star-tipped reindeer lichen

Site Characteristics

Slope Position: Upper^2/Crest^1
Surface Stoniness: (Very - Excessively)^2/(Moderately)^1
Bedrock Outcrop: (Slightly - Moderately)^2/(Very - Excessively)^1
Elevation Range: 107 - 175m
Slope Gradient: Gentle^2/Moderate^1
Aspect: North^1/South^2
Exposure: Exposed^2/Moderate^1
Microtopography: Level^2/Slightly^1
Drainage: Rapid^2/Well^1

Soil Characteristics

Soil Type: ST15^2/ST2^1
Parent Material: Glacial till^2/Till/Bedrock^1
Rooting Depth (cm): (<30)^2/nd^1
Duff Thickness (cm): (0-5)^2/(11-20)^1



North Mountain,
Kings County

OW6

White birch – Red oak – White ash / Marginal wood fern – Herb-Robert

Betula papyrifera – Quercus rubra – Fraxinus americana / Dryopteris marginalis – Geranium robertianum

n=5

Concept: The White birch - Red oak - White ash / Marginal wood fern - Herb Robert woodland is found on stony colluvium deposits and relatively stable talus slopes. OW6 is similar to OW3 (Red spruce / Red-berried elder / Rock polypody), but is generally associated with richer site conditions. OW6 is a rare woodland Vegetation Type (VT) found only in areas where steep topography and nearby mafic bedrock outcropping has led to rich stony colluvium and talus deposits. Deciduous woodlands on more acidic deposits have not been surveyed.

Vegetation: Canopy composition is somewhat variable but usually includes white birch, red oak and/or white ash; any of these tree species may dominate. A less common variant of OW6 is characterized by high ironwood cover. Understory associates may include plants tolerant of disturbance (e.g. red raspberry, white goldenrod and poverty grass), droughty substrates (e.g. marginal wood fern, fibrous root sedge, hair-bell and hay-scented fern) and/or nutrient enrichment (e.g. herb-Robert , Solomon's seal and maidenhair spleenwort.

Environmental Setting: The ecosystem is supported by soils associated with stony colluvium or embedded in crevices among talus rock fragments. These fragments of broken and weathered rock are found on side slopes and bases and are usually angular and cobble to boulder sized. Woodland vegetation can sometimes grow on islands of stable talus found within a larger area of more active deposition. The ecosystem is found at moderate elevations on steeper slopes, particularly in areas with more rugged topography. Most stands are in the North Mountain ecodistrict, but outliers occur in parts of Cape Breton. This Vegetation Type is also scattered across New Brunswick.

Successional Dynamics: An early to mid-successional stage is described, but successional development is strongly limited by site constraints. On more stable talus, gaps between rock fragments may become in-filled with deeper mineral soil and humus providing a better medium for the development of upland tolerant hardwood forest. This could be marked by a full Vegetation Type change as site conditions improve.

Ecological Features

Hardwood talus woodlands are an uncommon small patch ecosystem that are both undersampled and poorly understood in Nova Scotia. Plots were established on nutrient rich talus, but OW6 has been observed on more acidic substrates. Acidic (low nutrient) sites do not support white ash or ironwood, and have higher relative levels of beech, yellow birch and red maple. Similarly, stands from cooler areas are less likely to feature red oak or white ash. White birch – Red oak – White ash / Marginal wood fern – Herb-Robert woodland supports particularly unique habitat conditions, but most associated animal, plant and lichen species are undocumented. Some exceptions include the rock vole, Gaspé and long tailed shrews, various land snails, shepherdia and anise-root. Canopy closure is variable but stand structures tend to be complex, supporting diverse microhabitats.

Characteristic Plants	OW6 Freq. (%)	OW6 Cover (%)
White birch	100	12.6
White ash	100	8.0
Red oak	80	22.5
Sugar maple	80	3.3
Ironwood	60	10.7
Beech	60	9.3
White spruce	20	14.0
Yellow birch	20	5.0
Balsam fir	20	2.0
Red maple	20	2.0
Red spruce	20	2.0
Tree Layer (Mean % Cover)		**58**
Beaked hazelnut	60	4.3
Red oak	60	2.3
Striped maple	60	1.7
Fly honeysuckle	60	0.8
Western poison ivy	40	20.0
Red-berried elder	40	7.5
Beech	40	5.0
White birch	40	3.5
White ash	40	3.5
White spruce	40	1.0
Witch-hazel	20	10.0
Red raspberry	20	5.0
Balsam fir	20	2.0
Red maple	20	2.0
Sugar maple	20	1.0
Ironwood	20	1.0
Choke cherry	20	1.0
Hemlock	20	1.0
Shrub Layer (Mean % Cover)		**27**
Fibrous root sedge	100	2.3
White goldenrod	80	3.5
Marginal wood fern	80	3.0
Poverty grass	80	1.7
Herb-Robert	60	8.3
Common hair grass	60	5.2
Wood goldenrod	60	1.3
Christmas fern	60	1.2
Rough hawkweed	60	0.5
Sarsaparilla	60	0.4
Wood aster	40	5.0
Calico aster	40	1.3
Canada bluegrass	40	0.5
Heart-leaved aster	40	0.3
Common speedwell	40	0.3
Maidenhair spleenwort	40	0.2
Drooping wood sedge	20	3.0
Fireweed	20	1.0
Meadow hawkweed	20	1.0
Fowl meadow grass	20	1.0
Bracken	20	1.0
Rusty woodsia	20	1.0
New York aster	20	0.5
Strawberry	20	0.5
Hemp-nettle	20	0.5
Red baneberry	20	0.3
Rock polypody	20	0.2
Herb Layer (Mean % Cover)		**25**

Distinguishing Features

This hardwood woodland of white birch, red oak and ironwood occurs on talus slopes. White goldenrod, marginal wood fern and herb-Robert are strong indicators.

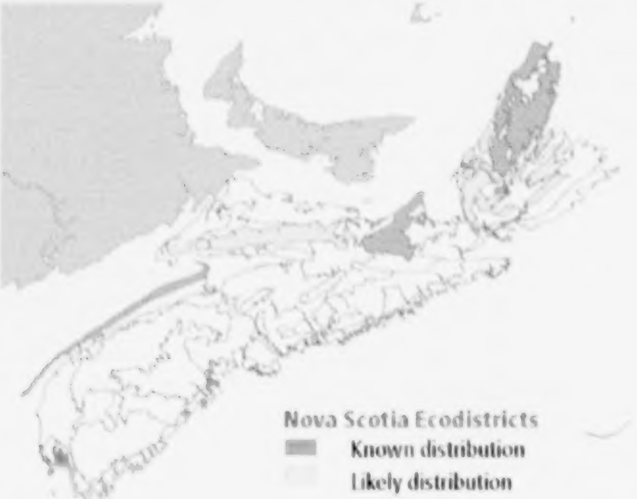
Red oak

Site Characteristics

Slope Position:	Middle^{4} Upper^{4} Lower^{2}
Surface Stoniness:	nd^{10}
Bedrock Outcrop:	nd^{10}
Elevation Range:	61 - 200m
Slope Gradient:	Moderate^{8} Gentle^{2}
Aspect:	East^{2} South^{8}
Exposure:	nd^{10}
Microtopography:	nd^{10}
Drainage:	nd^{10}

Soil Characteristics

Soil Type:	nd^{10}
Parent Material:	Colluvium^{10}
Rooting Depth (cm):	nd^{10}
Duff Thickness (cm):	nd^{10}



Nova Scotia Ecodistricts

▨	Known distribution
☐	Likely distribution

SH Spruce Hemlock Forest Group

(n = 283)

SH1	Hemlock / Pin cushion moss / Needle carpet	
SH2	Hemlock – White pine / Sarsaparilla	
SH3	Red spruce – Hemlock / Wild lily-of-the-valley	
SH4	Red spruce – White pine / Lambkill / Bracken……	**SH4a** Red spruce variant
SH5	Red spruce – Balsam fir / Schreber's moss	
SH6	Red spruce – Balsam fir / Stair-step moss – Sphagnum	
SH7	White spruce – Red spruce / Blueberry / Schreber's moss	
SH8	Balsam fir / Wood fern / Schreber's moss	
SH9	Balsam fir – Black spruce / Blueberry	
SH10	White spruce – Balsam fir / Broom moss	

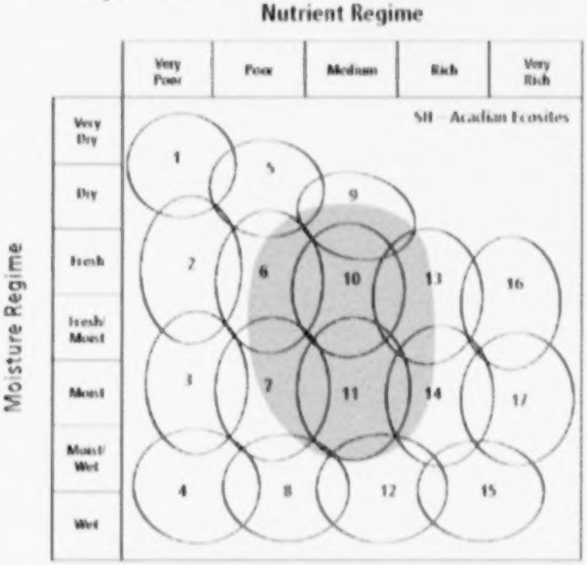
Concept: This group represents mid to late successional softwood Vegetation Types (VT) found on zonal sites within the Acadian Ecosite group. Red spruce, hemlock and white pine are the dominant trees. Balsam fir is usually associated with earlier successional stages, but is present in all stands at some stage of development. Regenerating overstory species, herbs typical of upland softwood forests and an extensive moss layer make up the understory. Mid successional stages are usually even-aged whereas late successional stages can develop uneven-aged characteristics due to the longevity of hemlock and red spruce.

Vegetation: Shade tolerant softwoods (red spruce, hemlock, balsam fir) and to a lesser extent shade intermediate softwoods (white pine, white spruce) dominate these closed canopy forests. The shrub layer is mainly regenerating overstory species, but on the poorer sites lambkill and blueberry are also common. Typical woodland flora (e.g. bunchberry, sarsaparilla, wild lily-of-the-valley) are common in the herb layer, with bracken also found on poorer sites. The bryophyte/lichen layer is dominated by Schreber's moss and stair-step moss. Bazzania is also common where coarse woody debris is high.

Environmental Setting: Vegetation types in this group are found on a range of slope positions. Most sites are non-rocky, but surface stoniness can be variable. Soils are mainly derived from glacial till deposits. A wide range of moisture levels can be found, but fertility is generally in the medium range. Various VTs form the matrix forest or large patches in many ecodistricts. This group is found throughout the province except in the Cape Breton Taiga (100) and Atlantic Coastal (800) ecoregions, with limited occurrence in the Cape Breton Highlands (200) ecoregion.

Successional Dynamics: This group is associated with mid and late successional zonal VTs. Mid-successional stages usually have a significant component of balsam fir in the overstory along with red spruce, black and white spruce and are typically even-aged. Late successional stages are dominated by hemlock, red spruce and white pine and will develop an uneven-aged structure between infrequent stand-level disturbance events. Disturbance agents include hurricanes (windthrow), fire, insects and harvesting.

Edatopic Grid



Ecological Features

These Acadian ecosystems occur as large patch or matrix forests over much of mainland Nova Scotia's lowland and upland ecoregions. The high shade tolerance and longevity of the dominant trees support well developed canopies, large and/or tall boles and snags, complex vertical structures and abundant coarse woody debris. Many VTs in this group can persist as climax forests with inherent mechanisms of self renewal and old growth development. The group can dominate some landscapes, providing large expanses of interior habitat and high landscape connectedness. Flying squirrels, American marten, fisher, deer and moose, snowshoe hare, bear, bats and diverse communities of birds and invertebrates use these forests for shelter, foraging and/or reproduction. Rare plants are somewhat uncommon but high invertebrate diversity, extensive fungal networks and rare lichens may occur, particularly in older forests.

Alma,
Pictou County

SH1

Hemlock / Pin cushion moss / Needle carpet

Tsuga canadensis / Leucobryum glaucum

n=46

Concept: This late successional Vegetation Type (VT) has an overstory dominated by hemlock, with only scattered red spruce, white pine and/or yellow birch. Hemlock dominance persists because of its ability to shade out other trees once it becomes established in the canopy. Due to the long-lived and shade-tolerant nature of hemlock, this VT will develop old forest characteristics that are maintained by gap disturbances. However, infrequent hurricanes and/or fires may periodically renew this VT at a stand-level. SH1 is a typical Acadian softwood VT found on zonal sites throughout mainland Nova Scotia and parts of Cape Breton.

Vegetation: Hemlock is the dominant overstory tree. The shrub layer is primarily regenerating conifers, especially hemlock, red spruce and balsam fir. Herb cover can be diverse, but coverage is usually low. Typical species include evergreen wood fern, rose twisted stalk and starflower. The forest floor is mostly needle carpet with low bryophyte coverage. Pin cushion moss is often found in this VT, and occurrence of bazzania can be significant where coarse woody debris (CWD) has accumulated on the forest floor.

Environmental Setting: SH1 is mainly associated with dry to fresh/moist, nutrient medium soils of glacial or glaciofluvial origin. This VT can be found throughout mainland Nova Scotia and parts of Cape Breton. In Cape Breton it is only found on steep slopes of major rivers and along the Bras d'Or Lakes. On the mainland, SH1 is most often found within the Western ecoregion due to hemlock's preference for warmer climatic conditions. Across the Acadian Forest region, most occurrences of this VT are in Nova Scotia.

Successional Dynamics: SH1 is a late successional climatic climax VT dominated by hemlock. It can develop from several early and mid-successional VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern), IH4 (Trembling aspen / Wild raisin / Bunchberry), IH6 (White birch – Red maple / Sarsaparilla – Bracken), SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum) and SH8 (Balsam fir / Wood fern / Schreber's moss). SH1 can also transition from the climax unit SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) depending on disturbance patterns. Early successional stages can be by-passed if at the time of disturbance advanced hemlock regeneration is retained (as could happen after a stand-level disturbance such as windthrow or harvesting). Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged structure as it matures. Between large-scale disturbance events SH1 will be maintained through gap replacement.

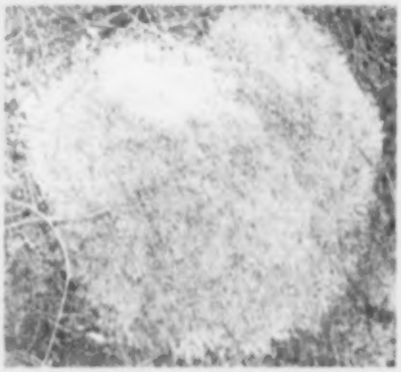
Ecological Features

Stands typically form large patches in the Western ecoregion and small patches elsewhere. Hemlock is the province's longest-lived softwood species promoting old growth development. The oldest forests support lichens, such as coral lichen, indicators of ecological continuity. This tree is also very shade-tolerant, responding well to release after decades of understory suppression. Mature stands provide large diameter cavity trees and very decay resistant snags and coarse woody material. This forest may provide cover for moose and deer, and habitat for marten, flying squirrels and diverse fungi. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals, while large trees can provide pileated woodpecker, barred owl and northern goshawk nest sites. Boreal chickadee, pine siskin, and both white-winged and red crossbills eat hemlock seeds. Downy and creeping rattlesnake plantains are the only known rare plants.

Characteristic Plants	SH1 Freq. (%)	SH1 Cover (%)
Hemlock	100	73.7
Red spruce	70	9.0
Red maple	65	5.2
Yellow birch	50	4.7
White birch	39	4.2
White pine	37	3.1
Balsam fir	17	2.5
Red oak	13	2.7
White ash	11	2.0
Tree Layer (Mean % Cover)		**90**
Hemlock	83	3.1
Balsam fir	70	3.1
Red spruce	70	2.7
Red maple	70	0.3
White pine	43	0.3
Red oak	33	0.1
Yellow birch	33	0.1
Striped maple	30	0.5
Fly-honeysuckle	24	0.2
Serviceberry	22	0.1
Wild raisin	22	0.1
Shrub Layer (Mean % Cover)		**8**
Wild lily-of-the-valley	83	0.4
Starflower	63	0.3
Evergreen wood fern	50	0.5
Partridge berry	43	0.4
Bluebead lily	43	0.1
Indian pipe	41	0.1
Sarsaparilla	30	1.0
Painted trillium	26	0.1
Rose twisted stalk	26	0.1
Goldthread	24	3.4
Bracken	24	0.6
Bunchberry	24	0.4
New York fern	24	0.4
Teaberry	22	3.0
Twinflower	22	0.2
Wood aster	22	0.1
Christmas fern	20	0.7
Indian cucumber root	20	0.1
Herb Layer (Mean % Cover)		**5**
Stair-step moss	83	14.6
Schreber's moss	74	11.0
Bazzania	72	7.4
Hypnum moss	70	1.6
Broom moss	63	1.3
Pin cushion moss	28	0.1
Bryo-Lichen Layer (Mean % Cover)		**28**

Distinguishing Features

This is a softwood forest dominated by hemlock on well drained sites. Shrub and herb layers are very sparse. The forest floor is typically needle carpet with low moss coverage. Pin cushion moss is common.

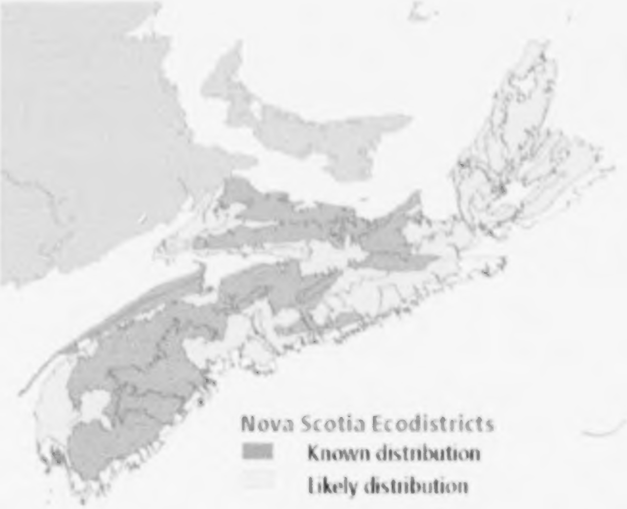

Pin cushion moss

Site Characteristics

Slope Position: Middle^{3} Level^{2} Lower^{2} Upper^{2} Other^{1}
Surface Stoniness: (Non - Slightly)^{5} (Moderately)^{3} (Very - Excessively)^{2}
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 12 - 200m
Slope Gradient: Gentle^{4} Level^{2} Moderate^{2} Other^{1} nd^{1}
Aspect: North^{1} East^{2} South^{3} West^{2} None^{2}
Exposure: Moderate^{6} Mod. exposed^{2} Mod. sheltered^{2}
Microtopography: Moderately^{3} Slightly^{3} Strongly^{2} Other^{2}
Drainage: Well^{5} Moderately well^{4} Imperfect^{1}

Soil Characteristics

Soil Type: ST2^{5} ST2-G^{1} ST2-L^{1} ST6^{1} ST8^{1} Other^{1}
Parent Material: Glacial till^{7} Glaciofluvial^{1} Other^{1} nd^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{4} (>45)^{4} nd^{1}
Duff Thickness (cm): (0-5)^{2} (6-10)^{4} (11-20)^{2} nd^{2}



4th Christopher Lake, Queens County

SH2

Hemlock – White pine / Sarsaparilla

Tsuga canadensis – Pinus strobus / Aralia nudicaulis

n=9

Concept: This late successional Vegetation Type (VT) has an overstory dominated by hemlock and white pine, with minor components of many other species. White pine may occur as a super canopy position. Red spruce presence has been reduced in this VT by partial stand level disturbances from windthrow, bark beetle and/or harvesting. Due to the long-lived and shade-tolerant nature of the dominant tree species, this VT will develop old forest characteristics that are maintained by gap disturbances. However, infrequent hurricanes and/or fires may periodically renew this VT at a stand-level. SH2 is a typical Acadian softwood VT found on zonal sites that have experienced partial stand-level disturbance.

Vegetation: Hemlock and white pine are the dominant overstory trees, with lesser amounts of red spruce, red maple, white birch and balsam fir. The shrub layer is primarily regenerating tree species such as balsam fir, hemlock and red spruce. Regeneration coverage can be extensive depending on crown closure. Herb coverage is usually low and includes typical upland species such as wild lily-of-the-valley, partridge-berry, starflower and sarsaparilla. Schreber's moss, stair-step moss and hypnum moss are common in the bryophyte layer along with bazzania.

Environmental Setting: SH2 is mainly associated with fresh to fresh-moist, nutrient medium soils of glacial origin. This VT can be found throughout mainland Nova Scotia and parts of Cape Breton. However, it is mostly associated with the Western ecoregion because of hemlock's preference for warmer temperatures. Across the Acadian Forest region, most occurrences of this VT are in Nova Scotia. The VT is rare in New Brunswick and unconfirmed for Prince Edward Island.

Successional Dynamics: SH2 is a late successional climatic climax VT dominated by hemlock and white pine and shaped by partial stand-level disturbance. It can develop from several mid-successional VTs including SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum) and SH8 (Balsam fir / Wood fern / Schreber's moss). This VT develops an uneven-aged structure as it matures with gaps created by the loss of red maple, white birch and balsam fir. These species are replaced by longer-lived hemlock, red spruce, yellow birch and white pine. Between large scale disturbance events SH2 will continue or transition to SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) or SH1 (Hemlock / Pin cushion moss / Needle carpet) through gap replacement.

Ecological Features

This VT typically forms large patches in the Western ecoregion, and small patches elsewhere. The longevity of hemlock and white pine promote old growth development. The oldest forests support lichens, such as coral lichen, indicators of ecological continuity. Hemlock is very shade-tolerant, responding to release after decades of understory suppression, whereas white pine (which has only intermediate shade tolerance) will not thrive for long without release. Mature forests provide large cavity trees, decay resistant snags and coarse woody material and supercanopy pine. This forest may provide cover for moose and deer, and habitat for marten, flying squirrels and various fungi (e.g. hemlock varnish shelf and pine mushrooms). Downed coarse woody debris may provide cover for red-backed salamanders and small mammals, while large trees can provide pileated woodpecker, barred owl and northern goshawk nest sites. Boreal chickadee, pine siskin and both white-winged and red crossbills eat hemlock and white pine seeds. Downy rattlesnake plantain is the only known rare plant.

Characteristic Plants

	SH2	
	Freq. (%)	Cover (%)
Hemlock	100	44.2
White pine	100	26.3
Red maple	89	10.8
Red spruce	78	6.3
White birch	33	4.3
Yellow birch	33	2.3
Balsam fir	22	5.0
Black spruce	11	15.0
Beech	11	7.0
Red pine	11	5.0
Tamarack	11	3.0
Ironwood	11	1.0
Large-tooth aspen	11	0.1
Red oak	11	0.1
Sugar maple	11	0.1
Trembling aspen	11	0.1
White spruce	11	0.1
Tree Layer (Mean % Cover)		**91**
Red maple	89	0.2
Red spruce	78	1.2
Hemlock	67	1.6
Red oak	67	0.1
Serviceberry	56	0.1
White pine	56	0.1
Balsam fir	44	6.8
Beech	44	0.4
Striped maple	44	0.1
Ironwood	22	1.1
Sugar maple	22	0.5
Trembling aspen	22	0.1
White birch	22	0.1
Shrub Layer (Mean % Cover)		**7**
Wild lily-of-the-valley	89	0.8
Starflower	78	0.5
Sarsaparilla	67	0.9
Indian pipe	56	0.1
Partridge berry	44	1.9
New York fern	44	0.3
Rose twisted stalk	33	0.2
Bracken	33	0.1
Bunchberry	33	0.1
Christmas fern	22	0.9
Hay-scented fern	22	0.8
Evergreen wood fern	22	0.5
Painted trillium	22	0.3
Bluebead lily	22	0.2
Common speedwell	22	0.1
Indian cucumber root	22	0.1
Lady fern	22	0.1
Pine sap	22	0.1
Teaberry	22	0.1
Twinflower	22	0.1
Herb Layer (Mean % Cover)		**5**
Stair-step moss	78	5.4
Bazzania	67	5.4
Schreber's moss	67	2.4
Broom moss	56	1.1
Hypnum moss	44	3.4
Bryo-Lichen Layer (Mean % Cover)		**12**

Distinguishing Features

Hemlock and white pine (sometimes in a super canopy position) dominate this softwood forest on well drained sites. The forest floor is typically needle carpet with low moss coverage.

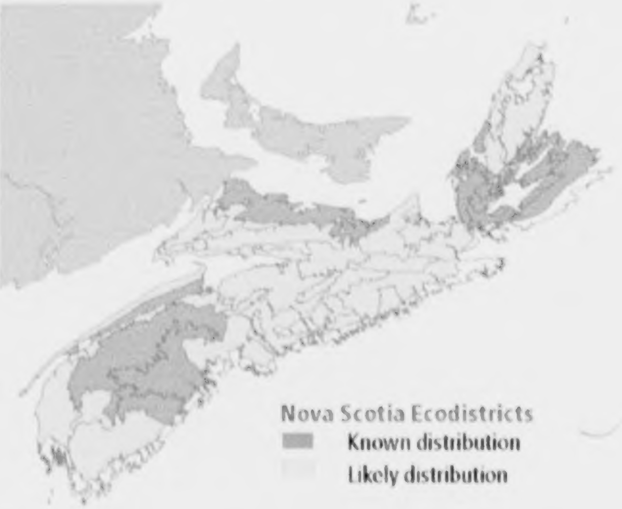
Hemlock branch

Site Characteristics

Slope Position:	Level^7 Crest^1 Lower^1 Upper^1
Surface Stoniness:	(Non - Slightly)^7 (Very - Excessively)^3
Bedrock Outcrop:	(Non-rocky)^9 (Slightly - Moderately)^1
Elevation Range:	20 - 114m
Slope Gradient:	Level^6 Gentle^1 Moderate^1 Steep^1 nd^1
Aspect:	North^1 South^2 West^1 None^6
Exposure:	Moderate^7 Mod. sheltered^2 Mod. exposed^1
Microtopography:	Slightly^5 Moderately^2 Strongly^2 Severely^1
Drainage:	Moderately well^7 Well^3

Soil Characteristics

Soil Type:	ST2^6 ST3-L^1 ST5^1 ST6^1 ST8-C^1
Parent Material:	Glacial till^7 Alluvium^1 Colluvium^1 nd^1
Rooting Depth (cm):	(30-45)^3 (>45)^6 nd^1
Duff Thickness (cm):	(0-5)^3 (6-10)^1 (11-20)^5 nd^1



West Branch Lake,
Pictou County

SH3

Red spruce – Hemlock / Wild lily-of-the-valley

Picea rubens – Tsuga canadensis / Maianthemum canadense

n=47

Concept: This late successional Vegetation Type (VT) has an overstory dominated by red spruce with hemlock as a co-dominant. Scattered white pine can also be found, especially in western Nova Scotia. Due to the long-lived and shade-tolerant characteristics of the dominant tree species, this VT will develop old forest features that are maintained by gap disturbances. However, infrequent hurricanes and/or fires may periodically renew this VT at a stand-level. SH3 is a typical Acadian softwood VT found on zonal sites throughout mainland Nova Scotia and parts of Cape Breton.

Vegetation: Red spruce and hemlock are the dominant overstory trees. The shrub layer is primarily regenerating tree species such as hemlock, balsam fir, red spruce and red maple. Regeneration can be extensive depending on crown closure. Herb layer density is usually low, but species richness can be relatively high. Typical species include wild lily-of-the-valley, bluebead lily, partridge-berry, starflower and painted trillium. Schreber's moss and stair-step moss are the main bryophytes, but occurrence of bazzania can also be significant where coarse woody debris (CWD) has accumulated on the forest floor.

Environmental Setting: SH3 is mainly associated with fresh to moist, nutrient medium soils of glacial origin. This VT can be found throughout mainland Nova Scotia and on lower slopes in Cape Breton. However, it is mostly associated with the Western ecoregion due to the preference of hemlock for warmer temperatures. This VT is uncommon in both New Brunswick and Prince Edward Island.

Successional Dynamics: SH3 is a late successional climatic climax VT dominated by red spruce and hemlock. It can develop from several early and mid-successional VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern), IH4 (Trembling aspen / Wild raisin / Bunchberry), IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern), IH6 (White birch – Red maple / Sarsaparilla – Bracken), MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread), SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum) and SH8 (Balsam fir / Wood fern / Schreber's moss). Early successional stages can be by-passed if, at the time of disturbance, advanced red spruce and hemlock regeneration is retained (as could happen after a stand-level disturbance such as windthrow or harvesting). Depending on disturbance history this VT can be even-aged, but it will develop an uneven-aged structure as it matures. Between large-scale disturbance events this unit will continue or transition to SH1 (Hemlock / Pin cushion moss / Needle carpet) through gap replacement.

Ecological Features

This closed canopy forest typically occurs over hundreds of hectares forming matrix and large patch ecosystems. The longevity of the dominant tree species creates opportunities for old growth. The oldest forests support lichens, such as coral lichen and Methuselah's beard lichen—indicators of ecological continuity. Both red spruce and hemlock are very shade tolerant and respond well to release after decades of suppression. Mature forests provide large diameter cavity trees, snags and coarse woody material. Hemlock is very decay resistant and large dead trees persist for many decades. This forest may provide habitat for marten and flying squirrels, and cover for moose and deer. Coarse woody debris can provide cover for red-backed salamanders and small mammals, while large trees may provide pileated woodpecker, barred owl and northern goshawk nest sites. Boreal chickadee, pine siskin and both the white-winged and red crossbills eat hemlock and red spruce seeds. Creeping rattlesnake plantain is the only known plant species of conservation concern.

Characteristic Plants	SH3	
	Freq. (%)	Cover (%)
Red spruce	100	38.4
Hemlock	100	31.2
Red maple	72	7.2
White birch	43	4.9
White pine	38	7.3
Balsam fir	38	5.1
Yellow birch	38	4.5
Black spruce	13	12.2
Large tooth aspen	11	3.4
Tree Layer (Mean % Cover)		**86**
Balsam fir	89	5.0
Red maple	89	0.6
Hemlock	81	3.6
Red spruce	81	2.2
White pine	45	0.1
Serviceberry	34	0.1
Striped maple	32	1.1
Yellow birch	30	0.9
Wild raisin	30	0.1
Red oak	26	0.1
Velvet-leaf blueberry	21	0.3
Lowbush blueberry	21	0.1
Shrub Layer (Mean % Cover)		**12**
Wild lily-of-the-valley	77	1.4
Starflower	68	0.3
Painted trillium	51	0.1
Partridge berry	49	0.2
Bluebead lily	47	0.3
Goldthread	43	0.4
Indian pipe	43	0.1
Bracken	34	3.3
Sarsaparilla	34	0.9
Hay-scented fern	26	1.6
Evergreen wood fern	26	1.4
Bunchberry	26	0.3
New York fern	21	0.6
Wood aster	21	0.4
Indian cucumber root	21	0.3
Ground pine	21	0.1
Pink lady's slipper	21	0.1
Herb Layer (Mean % Cover)		**6**
Schreber's moss	94	24.8
Stair-step moss	83	16.7
Bazzania	83	7.4
Hypnum moss	74	1.8
Broom moss	74	1.1
Wavy dicranum	45	1.6
Pin cushion moss	36	0.2
Hair-cap moss	26	0.6
Bryo-Lichen Layer (Mean % Cover)		**47**

Distinguishing Features

Red spruce and hemlock are the dominant overstory species in this softwood forest. Stands are often uneven-aged with large amounts of coarse woody debris. Moss can be extensive over the forest floor. Scattered white pines are often present, especially in western Nova Scotia.

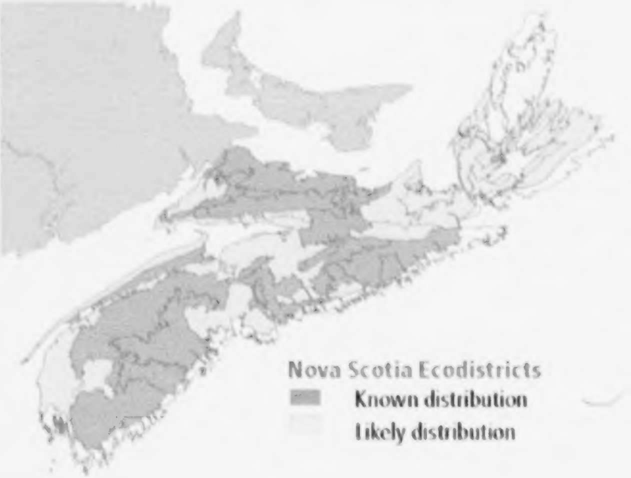
Hemlock crown

Site Characteristics

Slope Position:	Level^3 Middle^3 Lower^2 Upper^1 Other^1
Surface Stoniness:	(Non - Slightly)^5 (Moderately)^3 (Very - Excessively)^2
Bedrock Outcrop:	(Non-rocky)^9 (Slightly - Moderately)^1
Elevation Range:	28 - 189m
Slope Gradient:	Gentle^4 Level^3 Moderate^2 Steep^1
Aspect:	North^1 East^2 South^2 West^3 None^2
Exposure:	Moderate^7 Mod. exposed^1 Mod. Sheltered^1 Other^1
Microtopography:	Moderately^4 Slightly^3 Strongly^2 Other^1
Drainage:	Moderately well^4 Well^3 Imperfect^2 Other^1

Soil Characteristics

Soil Type:	ST2^4 ST2-L^1 ST2-G^1 ST3^1 ST3-L^1 ST6^1 Other^1
Parent Material:	Glacial till^9 Other^1
Rooting Depth (cm):	(<30)^1 (30-45)^5 (>45)^4
Duff Thickness (cm):	(0-5)^1 (6-10)^4 (11-20)^4 (21-40)^1



Sherbrooke Lake, Lunenburg County

SH4

Red spruce – White pine / Lambkill / Bracken

Picea rubens – Pinus strobus / Kalmia angustifolium / Pteridium aquilinum

SH4a

Red spruce variant

Picea rubens

n=39

Concept: This late successional Vegetation Type (VT) has abundant red spruce and white pine with minor coverage of other species such as red maple, white birch, black spruce and balsam fir (hemlock is usually absent from this VT). There is one variant (SH4a) where red spruce cover is dominant with only scattered white pine. Red spruce – White pine / Lambkill / Bracken is a typical Acadian softwood VT found on dryer, poorer sites which are bordering on zonal conditions.

Vegetation: Red spruce and white pine are the dominant overstory trees with red maple, balsam fir, and black spruce occasionally co-dominant. Hybridization of red and black spruce is common and creates difficulty in distinguishing these two species. Regenerating balsam fir and red spruce are prominent in the shrub layer along with ericaceous species such as lambkill and blueberry. Overall coverage and diversity of herbs is low with bracken the most prevalent species. (Coverage may be higher in the red spruce variant SH4a.) Bazzania and Schreber's moss are the dominant bryophytes, with small patches of reindeer mosses occurring on drier sites.

Environmental Setting: SH4 is mainly associated with dry to fresh, nutrient poor to medium soils of glacial origin. These soils are generally medium to coarse textured and often stony. This VT is found throughout mainland Nova Scotia and parts of Cape Breton Island. It is relatively common across southern and central New Brunswick but absent from Prince Edward Island.

Successional Dynamics: SH4 is a late successional climatic climax VT dominated by red spruce and white pine. It can develop from early successional VTs including IH1 (Large-tooth aspen / Lambkill / Bracken) and IH2 (Red oak – Red maple / Witch-hazel) and from mid-successional types such as SH5 (Red spruce – Balsam fir / Schreber's moss) and SH9 (Balsam fir – Black spruce / Blueberry). This VT is unlikely to shift to SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) since hemlock prefers sites with greater moisture and fertility. Early successional stages can be by-passed if at the time of disturbance advanced red spruce and white pine regeneration is retained (as could happen after a stand level disturbance such as windthrow or harvesting). Depending on disturbance history this VT can be even-aged, but it will develop an uneven-aged structure as it matures. Between large-scale disturbance events this unit will be maintained through gap replacement.

Ecological Features

This matrix forest typically occurs over hundreds of hectares. The longevity of red spruce supports old growth development. This tree is very tolerant of understory shade, responding well to release after decades of suppression, whereas white pine, which has only intermediate shade tolerance, requires release at a young age. In old forests, white pine may outlive red spruce, developing a supercanopy, and sometimes hollow, large stemmed trees. Mature forests provide large diameter cavity trees, snags and downed coarse woody material. This forest may provide cover for moose and deer, and habitat for fisher, flying squirrels and red squirrels. Coarse woody debris may provide cover for red-backed salamanders and small mammals, while large trees can provide pileated woodpecker, barred owl and northern goshawk nest sites. Boreal chickadee, pine siskin and both the white-winged and red crossbills eat red spruce and white pine seeds. Creeping rattlesnake plantain is the only known rare plant.

Characteristic Plants

	SH4		SH4a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red spruce	100	43.2	100	51.5
White pine	100	19.8	67	4.4
Red maple	78	6.0	75	5.0
Balsam fir	44	8.7	58	12.4
White birch	33	3.6	33	6.5
Black spruce	30	9.5	33	23.3
Red oak	11	4.3		
Large-tooth aspen	11	4.0	8	3.0
Hemlock	11	3.7	17	2.5
Tree Layer (Mean % Cover)		**78**		**76**
Balsam fir	93	3.3	92	5.0
Red maple	85	0.4	92	0.3
Red spruce	81	3.9	92	3.6
Lambkill	70	2.7	92	3.1
White pine	63	0.1	42	0.8
Velvet-leaf blueberry	56	2.9	67	1.0
Wild raisin	52	0.1	67	0.1
Huckleberry	30	0.7		
Red oak	30	0.7	8	0.1
Witch-hazel	30	0.4		
False holly	30	0.1	50	0.3
Lowbush blueberry	26	0.1	33	0.9
Serviceberry	22	0.1	17	0.1
Shrub Layer (Mean % Cover)		**12**		**14**
Bracken	70	2.1	100	14.1
Wild lily-of-the-valley	70	0.3	67	2.0
Starflower	59	0.4	75	0.2
Bluebead lily	56	0.2	58	0.4
Bunchberry	52	0.9	58	1.6
Indian pipe	52	0.1	25	0.1
Goldthread	44	1.0	42	3.8
Painted trillium	41	0.1	92	0.4
Partridge-berry	33	1.1	8	0.1
Teaberry	33	0.4	42	0.6
Sarsaparilla	30	1.3	42	1.2
Indian cucumber root	30	0.2	25	0.1
Mayflower	26	0.1	17	0.1
Pink lady's slipper	22	0.1	33	0.1
Twinflower	19	0.4	25	0.4
Creeping snowberry	19	0.1	42	0.8
Herb Layer (Mean % Cover)		**5**		**21**
Bazzania	96	16.3	100	5.7
Schreber's moss	93	23.1	100	67.4
Broom moss	78	1.1	42	0.8
Hypnum moss	74	2.1	42	2.0
Stair-step moss	59	5.2	92	5.1
Wavy dicranum	56	2.3	75	4.4
Grey reindeer lichen	44	1.0	58	0.4
Cup lichens	41	0.1	17	0.1
Pin cushion moss	37	0.2	25	0.2
Ladies' tresses	22	1.1	25	0.7
Hair cap moss	19	0.3	25	0.4
Bryo-Lichen Layer (Mean % Cover)		**45**		**83**

Distinguishing Features

Red spruce and white pine are the dominant overstory species in this softwood forest. Hybridization of red and black spruce is common. Bracken and ericaceous shrubs such as lambkill and blueberry are indicative of poor and dry conditions. Hemlock is absent. The variant SH4a is similar with reduced levels of white pine.

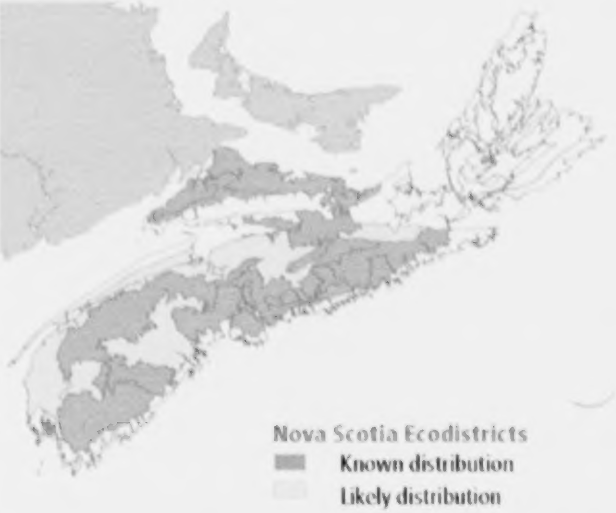
Blueberry

Site Characteristics

Slope Position:	Upper^4 Crest^2 Level^2 Lower^1 Middle^1
Surface Stoniness:	(Non - Slightly)^4 (Very - Excessively)^4 (Moderately)^2
Bedrock Outcrop:	(Non-rocky)^7 (Slightly - Moderately)^3
Elevation Range:	20 - 255m
Slope Gradient:	Gentle^4 Level^2 Moderate^2 Steep^1 nd^1
Aspect:	North^2 East^2 South^1 West^2 None^3
Exposure:	Moderate^7 Mod. exposed^1 Exposed^1 nd^1
Microtopography:	Slightly^5 Moderately^3 Other^2
Drainage:	Well^5 Moderately well^2 Rapid^2 Imperfect^1

Soil Characteristics

Soil Type:	ST2^5 ST1^1 ST2-G^1 ST2-L^1 ST6^1 ST15^1
Parent Material:	Glacial till^8 Till/Bedrock^1 nd^1
Rooting Depth (cm):	(<30)^1 (30-45)^5 (>45)^3 nd^1
Duff Thickness (cm):	(6-10)^2 (11-20)^6 (21-40)^1 nd^1



Big Indian Lake, Hants County

SH5

Red spruce – Balsam fir / Schreber's moss

Picea rubens – Abies balsamea / Pleurozium schreberi

n=83

Concept: This mid-successional Vegetation Type (VT) has abundant red spruce with varying amounts of balsam fir. Typically minor amounts of red maple and white birch indicate recent disturbance events, whereas yellow birch, white pine and hemlock indicate development toward a later successional stage. Red spruce – Balsam fir / Schreber's moss is a typical Acadian softwood VT found on zonal sites in Nova Scotia.

Vegetation: Red spruce is usually the dominant overstory tree, although balsam fir may be abundant in some stands. Both species are often well represented as regeneration in the shrub layer. Hybrid (red/black) spruce can also be found on more marginal sites. Low light availability often reduces the abundance of common woodland flora such as wild lily-of-the-valley, goldthread and bunchberry. A needle carpet is common under many stands, but coverage by Schreber's moss, stair-step moss and bazzania can be extensive in some.

Environmental Setting: SH5 is mainly associated with dry to fresh, nutrient poor to medium soils of glacial origin. These soils are generally medium to coarse textured and often stony. This VT is found throughout mainland Nova Scotia and parts of Cape Breton. It is relatively common in New Brunswick but absent from Prince Edward Island.

Successional Dynamics: SH5 is a predominantly even-aged, mid-successional VT dominated by red spruce. Usually SH5 develops from advanced regeneration present at the time of stand-level disturbance. If advanced regeneration is not present (or has been destroyed), SH5 can also develop from other VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern), IH4 (Trembling aspen / Wild raisin / Bunchberry), IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern), IH6 (White birch – Red maple / Sarsaparilla – Bracken) and MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread). This VT may succeed to later successional types such as SH1 (Hemlock / Pin cushion moss / Needle carpet), SH2 (Hemlock – White pine / Sarsaparilla), SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) and SH4 (Red spruce – White pine / Lambkill / Bracken).

Ecological Features

This closed canopy coniferous forest typically occurs over hundreds of hectares, forming matrix in many ecoregions. Balsam fir and red spruce are very shade-tolerant in the understory. Good seed crops in red spruce start at age 35-45, and the species does not regenerate well before age 50. Forests may provide habitat for marten, spruce grouse, black-backed woodpecker, red and flying squirrels. South facing slopes may provide winter cover for deer. Sapling stage forests are preferred habitat for snowshoe hare. Creeping rattlesnake plantain is the only plant species of conservation concern known from this VT.

Characteristic Plants	SHS	
	Freq. (%)	Cover (%)
Red spruce	98	63.1
Red maple	67	5.7
Balsam fir	53	12.9
White birch	33	4.7
Yellow birch	32	4.1
White pine	21	6.4
Hemlock	13	4.2
Tree Layer (Mean % Cover)		**80**
Balsam fir	92	4.7
Red spruce	82	6.7
Red maple	82	0.5
Velvet-leaf blueberry	41	0.8
Yellow birch	31	0.5
Wild raisin	28	0.1
White pine	27	0.7
False holly	27	0.1
Lambkill	25	1.0
Lowbush blueberry	20	0.3
Shrub Layer (Mean % Cover)		**12**
Wild lily-of-the-valley	62	0.4
Goldthread	61	1.7
Painted trillium	53	0.1
Starflower	52	0.3
Bunchberry	41	2.4
Bluebead lily	41	0.4
Bracken	33	1.8
Sarsaparilla	32	1.0
Evergreen wood fern	29	0.3
Hay-scented fern	26	0.2
Wood-sorrel	24	0.4
Indian cucumber root	22	0.1
Indian pipe	20	0.1
Herb Layer (Mean % Cover)		**5**
Schreber's moss	93	32.6
Stair-step moss	93	9.9
Bazzania	88	15.7
Broom moss	75	2.0
Hypnum moss	73	1.9
Wavy dicranum	47	2.7
Grey reindeer lichen	36	0.5
Hair-cap moss	34	0.9
Ladies' tresses	22	0.1
Pin cushion moss	22	0.1
Bryo-Lichen Layer (Mean % Cover)		**59**

Distinguishing Features

A softwood forest of abundant red spruce with varying amounts of balsam fir occurring on well drained sites. The absence of sphagnum moss (minor amounts in depressions) is diagnostic for identification of this unit.

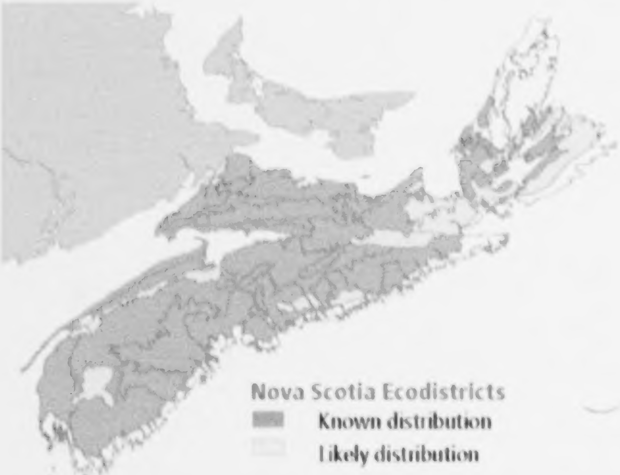
Schreber's moss

Site Characteristics

Slope Position: Upper^{1} Level^{4} Lower^{2} Middle^{2} Other^{1}
Surface Stoniness: (Non - Slightly)^{6} (Moderately)^{3} (Very - Excessively)^{1}
Bedrock Outcrop: (Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range: 9 - 268m
Slope Gradient: Gentle^{6} Level^{2} Moderate^{1} Other^{1}
Aspect: North^{2} East^{2} South^{2} West^{3} None^{1}
Exposure: Moderate^{6} Mod. exposed^{2} Mod. sheltered^{2}
Microtopography: Moderately^{5} Slightly^{2} Strongly^{2} Other^{1}
Drainage: Well^{5} Moderately well^{3} Imperfect^{1} Other^{1}

Soil Characteristics

Soil Type: ST2^{5} ST2-L^{2} ST6^{1} Other^{2}
Parent Material: Glacial till^{8} Till/Bedrock^{1} Other^{1}
Rooting Depth (cm): (<30)^{2} (30-45)^{4} (>45)^{3} nd^{1}
Duff Thickness (cm): (6-10)^{3} (11-20)^{6} nd^{1}



Castlereagh,
Colchester County

SH6

Red spruce – Balsam fir / Stair-step moss – Sphagnum

Picea rubens – Abies balsamea /
Hylocomium splendens – Sphagnum spp.

n=23

Concept: This mid-successional Vegetation Type (VT) is very similar to SH5 (Red spruce – Balsam fir / Schreber's moss), but occurs on moister sites. Tree cover is mainly red spruce with varying amounts of balsam fir. Typically minor amounts of red maple and white birch indicate recent disturbance events, whereas yellow birch, white pine and hemlock indicate development toward a later successional stage. Red spruce – Balsam fir / Stair-step moss – Sphagnum is a typical Acadian softwood VT found on moist, zonal sites in Nova Scotia.

Vegetation: Red spruce is usually the dominant overstory tree, although balsam fir may be abundant in some stands. Both species are usually well represented as regeneration in the shrub layer. Hybrid (red/black) spruce can also be found on more marginal sites. Low light availability often reduces the abundance of woodland flora, but moist soils associated with this VT generally support a higher diversity of species than drier red spruce types. In more moist sites, herbs like cinnamon fern, creeping snowberry, New York fern, interrupted fern and three seeded sedge will be present. The bryophyte layer is characterized by extensive coverage of mainly stair-step moss and Schreber's moss, with sphagnum moss present in wetter parts of the stand.

Environmental Setting: SH6 is mainly associated with fresh-moist to moist, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured and often stony. This VT is found throughout mainland Nova Scotia and parts of Cape Breton. It is common in New Brunswick but infrequent across Prince Edward Island.

Successional Dynamics: SH6 is a predominantly even-aged, mid-successional VT dominated by red spruce. Usually SH6 develops from advanced regeneration that was present at the time of stand-level disturbance. If advanced regeneration is not present (or has been destroyed), SH6 can also develop from other vegetation types including IH3 (Large-tooth aspen / Christmas fern – New York fern), IH4 (Trembling aspen / Wild raisin / Bunchberry), IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern), IH6 (White birch – Red maple / Sarsaparilla – Bracken) and MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread). This VT may succeed to later successional types such as SH1 (Hemlock / Pin cushion moss/ Needle carpet), SH2 (Hemlock – White pine / Sarsaparilla) and SH3 (Red spruce – Hemlock / Wild lily-of-the-valley).

Ecological Features

This closed canopy forest typically occurs over hundreds of hectares, forming matrix in many ecoregions. Balsam fir and red spruce are very shade-tolerant in the understory. Good seed crops in red spruce start at age 35-45, and the species does not regenerate well before age 50. Mature forests may provide habitat for spruce grouse, grey jays, red squirrels and flying squirrels. Large trees may provide nest sites for pileated and black-backed woodpeckers, barred owls and northern goshawks. South facing slopes may provide winter cover for deer. Young forests are preferred habitat for snowshoe hare. Creeping rattlesnake plantain is the only plant species of conservation concern known from this VT.

Characteristic Plants

	SH6	
	Freq. (%)	Cover (%)
Red spruce	100	54.3
Balsam fir	78	17.4
Red maple	70	5.4
Yellow birch	17	5.5
White birch	17	1.9
Black spruce	13	16.0
White pine	13	2.0
Tree Layer (Mean % Cover)		**76**
Balsam fir	100	5.6
Red spruce	91	4.5
Red maple	74	0.5
Lambkill	70	1.2
Velvet-leaf blueberry	57	0.8
False holly	52	0.6
Wild raisin	39	0.1
Serviceberry	35	0.1
White pine	30	0.3
White birch	22	1.0
Lowbush blueberry	22	0.4
Shrub Layer (Mean % Cover)		**13**
Goldthread	83	2.5
Wild lily-of-the-valley	74	0.6
Cinnamon fern	70	2.8
Bunchberry	70	2.1
Bracken	57	3.3
Creeping snowberry	52	0.8
Starflower	52	0.4
Painted trillium	48	0.1
Bluebead lily	43	1.2
Sarsaparilla	43	0.7
New York fern	35	2.6
Three seeded sedge	30	0.5
Twinflower	30	0.2
Wood-sorrel	26	1.1
Hay-scented fern	22	3.1
Interrupted fern	22	2.1
Evergreen wood fern	22	0.2
Herb Layer (Mean % Cover)		**13**
Schreber's moss	96	41.2
Stair-step moss	96	19.9
Bazzania	91	11.9
Ladies' tresses	65	1.1
Wavy dicranum	57	7.5
Broom moss	57	2.6
Common green sphagnum	52	11.6
Hypnum moss	52	1.5
Hair-cap moss	30	0.1
Pale fat leaved sphagnum	26	0.9
Plume moss	22	0.1
Bryo-Lichen Layer (Mean % Cover)		**87**

Distinguishing Features

A softwood forest of abundant red spruce with varying amounts of balsam fir occurring on imperfectly drained sites. Cinnamon fern, creeping snowberry, New York fern, interrupted fern and three seeded sedge indicate moister soils. The presence of sphagnum moss can be used to identify this vegetation type.

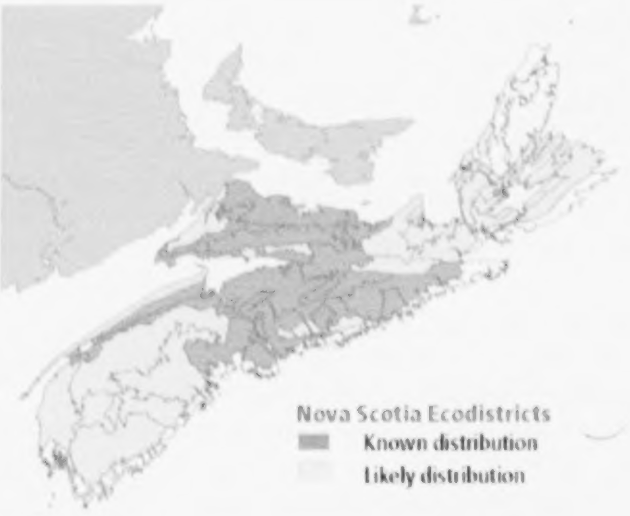
Stair-step moss

Site Characteristics

Slope Position:	Level^{7} Lower^{2} Other^{1}
Surface Stoniness:	(Non - Slightly)^{9} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	16 - 278m
Slope Gradient:	Level^{7} Gentle^{3}
Aspect:	North^{1} East^{2} South^{1} None^{6}
Exposure:	Moderate^{6} Mod. exposed^{3} Mod. sheltered^{1}
Microtopography:	Slightly^{4} Moderately^{3} Level^{1} Other^{2}
Drainage:	Imperfect^{7} Moderately well^{3}

Soil Characteristics

Soil Type:	ST3^{4} ST6^{2} ST3-G^{1} ST16^{1} Other^{2}
Parent Material:	Glacial till^{7} Till/Bedrock^{1} Other^{2}
Rooting Depth (cm):	(<30)^{6} (30-45)^{3} (>45)^{1}
Duff Thickness (cm):	(6-10)^{3} (11-20)^{7}



Nova Scotia Ecodistricts

▨ Known distribution

☐ Likely distribution

Skinners Cove, Pictou County

SH7

White spruce – Red spruce / Blueberry / Schreber's moss

Picea glauca – Picea rubens / Vaccinium spp. / Pleurozium schreberi

n=6

Concept: This mid-successional Vegetation Type (VT) has an overstory of white and red spruce with lesser balsam fir. The absence of white spruce in the understory suggests this VT will advance to increased red spruce and balsam fir coverage over time. SH7 usually follows stand-replacing disturbance events such as fire, windthrow or harvesting.

Vegetation: White spruce, red spruce and balsam fir are the main overstory trees, but stands may also contain white, yellow or grey birch – the presence of which indicates recent disturbance events. Hybrid (red/black) spruce can also be found on poorer sites. The shrub layer is dominated by regenerating softwoods, primarily red spruce and balsam fir. Other shrubs include mountain-ash, wild raisin and lowbush blueberry. The herb layer is comprised of typical woodland flora (e.g. wild lily-of-the-valley and bunchberry), but species richness and coverage are both low. The bryophyte layer also has low species richness, but Schreber's moss and stair-step moss coverage is high in some stands.

Environmental Setting: SH7 is mainly associated with fresh, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured and are sometimes shallow to bedrock. This VT is most common in the Northumberland Lowlands and Cumberland Hills ecodistricts. This VT is uncommon in both Prince Edward Island and New Brunswick.

Successional Dynamics: SH7 is a predominantly even-aged, mid-successional VT dominated by white and red spruce. This VT usually follows stand-replacing disturbances from fire, windthrow or harvesting. Possible early successional VTs include IH3 (Large-tooth aspen / Christmas fern – New York fern), IH4 (Trembling aspen / Wild raisin / Bunchberry), IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern) and IH6 (White birch – Red maple / Sarsaparilla – Bracken). In the absence of stand-level disturbance, white spruce and balsam fir in this VT will eventually succumb to agents (such as bark beetle, tussock moth and disease) allowing red spruce and sometimes yellow birch to increase in dominance. Possible later successional VTs include SH5 (Red spruce – Balsam fir / Schreber's moss), SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum) and MW1 (Red spruce – Yellow birch / Evergreen wood fern). Hemlock is unlikely to be a major component of later successional stages.

Ecological Features

This is a large patch closed canopy forest with limited distribution in northern Nova Scotia. Red spruce is very shade-tolerant and white spruce slightly less tolerant in the understory. Good seed crops in red spruce start at age 35-45, and the species does not regenerate well before age 50. Mature forests may provide habitat for red squirrels and flying squirrels. Spruce seeds provide food for finches, crossbills and kinglets. South facing slopes may provide winter cover for deer. These forests may support abundant mycorrhizal mushrooms including chanterelles and boletes. No plant or lichen species of conservation concern were found in available plot data.

Characteristic Plants

	SH7 Freq. (%)	SH7 Cover (%)
Red spruce	100	26.3
White spruce	100	24.0
Balsam fir	100	11.8
Red maple	83	3.4
White birch	83	1.4
Yellow birch	33	9.0
Black spruce	33	8.5
Grey birch	17	4.0
Tree Layer (Mean % Cover)		**73**
Balsam fir	100	2.6
Red spruce	83	0.9
Red maple	83	0.1
Wild raisin	50	0.7
Lowbush blueberry	50	0.1
Mountain-ash	50	0.1
Velvet-leaf blueberry	33	3.5
Black spruce	33	0.5
Lambkill	33	0.5
False holly	33	0.1
Yellow birch	33	0.1
Shrub Layer (Mean % Cover)		**7**
Wild lily-of-the-valley	100	1.0
Starflower	67	0.3
Evergreen wood fern	67	0.2
Painted trillium	67	0.1
Bluebead lily	50	1.4
Bunchberry	50	1.0
Bracken	50	0.9
Sarsaparilla	50	0.3
Goldthread	50	0.1
Cinnamon fern	33	0.3
Interrupted fern	33	0.3
Wood aster	33	0.3
Ground pine	33	0.1
Indian pipe	33	0.1
Partridge-berry	33	0.1
Pink lady's slipper	33	0.1
Rose twisted stalk	33	0.1
Herb Layer (Mean % Cover)		**4**
Schreber's moss	100	31.8
Stair-step moss	100	10.5
Wavy dicranum	83	3.5
Broom moss	83	0.7
Hair-cap moss	67	0.3
Bazzania	50	2.5
Hypnum moss	50	0.3
Ladies' tresses	33	0.3
Grey reindeer lichen	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**48**

Distinguishing Features

White spruce growing with red spruce and lesser balsam fir is diagnostic of this softwood forest usually found in northern Nova Scotia. Schreber's moss and stair-step moss coverage is high in many stands.

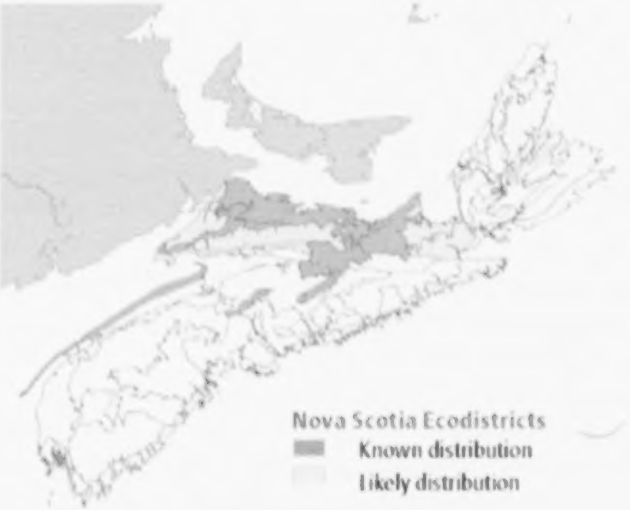
Wild raisin

Site Characteristics

Slope Position: Upper^5 Level^3 Crest^2
Surface Stoniness: (Non - Slightly)^7 (Moderately)^3
Bedrock Outcrop: (Non-rocky)^8 (Slightly - Moderately)^2
Elevation Range: 30 - 228m
Slope Gradient: Level^5 Gentle^5
Aspect: North^2 East^2 South^2 West^2 None^2
Exposure: Moderate^5 Mod. exposed^3 Mod. sheltered^2
Microtopography: Moderately^3 Slightly^3 Strongly^3
Drainage: Well^7 Moderately well^2 Imperfect^1

Soil Characteristics

Soil Type: ST2^3 ST6^3 ST2-L^2 ST15^2
Parent Material: Glacial till^8 Till/Bedrock^2
Rooting Depth (cm): (<30)^3 (30-45)^5 (>45)^2
Duff Thickness (cm): (0-5)^2 (6-10)^3 (11-20)^5



Nova Scotia Ecodistricts

▇	Known distribution
▢	Likely distribution

MacInnis Lake,
Cape Breton County

SH8

Balsam fir / Wood fern / Schreber's moss

Abies balsamea / Dryopteris spp. / Pleurozium schreberi

n=23

Concept: This early to mid successional Vegetation Type (VT) has abundant balsam fir with minor amounts of other softwood and hardwood species. Due to the short-lived nature of balsam fir, this VT is often associated with significant coarse wood debris (CWD) and/or snags, as well as extensive balsam fir regeneration. Balsam fir / Wood fern / Schreber's moss usually follows stand-replacing disturbance events such as insect infestation, windthrow or harvesting.

Vegetation: Balsam fir is the dominant overstory tree, with varying amounts of red maple, red spruce, white spruce, black spruce, white birch and yellow birch (although not usually all found in one stand). Balsam fir regeneration can be extensive, with red maple usually present in lesser amounts. Other shrubs include false holly, wild raisin and mountain-ash. Typical herb species include evergreen wood fern, starflower, wild lily of the valley, bunchberry, goldthread and wood sorrel. The often extensive bryophyte layer is made up of Schreber's moss, stair-step moss, wavy dicranum, broom moss, hypnum moss and bazzania.

Environmental Setting: SH8 is mainly associated with fresh to moist, nutrient poor to medium soils of glacial origin. These soils are generally medium to coarse textured and often stony. This VT is found throughout mainland Nova Scotia and on the Cape Breton lowlands. SH8 is common and abundant across lower elevations of the other Maritime provinces.

Successional Dynamics: SH8 is a predominantly even-aged, mid-successional VT dominated by balsam fir. This VT usually follows stand-replacing disturbances from insect infestation, windthrow or harvesting. On the Cape Breton lowlands SH8 will perpetuate from advanced regeneration as the overstory deteriorates. Spruce budworm epidemics can also cause a shift to an earlier successional stage dominated by white birch, red maple and aspen (e.g. IH4 and IH6). On mainland Nova Scotia, SH8 may succeed to SH5 (Red spruce – Balsam fir / Schreber's moss) or SH6 (Red spruce – Balsam fir / Stair-step moss – Sphagnum).

Ecological Features

This closed canopy forest occurs primarily on mainland Nova Scotia, where it typically forms matrix and large patch ecosystems. Balsam fir acts as a nurse species, promoting red spruce and hemlock regeneration. The short life-span of balsam fir contributes substantial coarse woody material to the ecosystem, often in pulses following insect outbreaks, disease or wind storms. Balsam fir is very shade tolerant in the understory and can sustain a significant presence throughout successional development. Mature forests may provide habitat for numerous mammals (including flying squirrels, moose, deer), numerous bird species, and lichens (including abundant old man's beard, an important food and nest material). No plant or lichen species of conservation concern were found in available plot data.

Characteristic Plants	SH8	
	Freq (%)	Cover (%)
Balsam fir	100	60.5
White birch	57	3.3
Red maple	48	6.5
Red spruce	35	6.8
White spruce	30	12.9
Yellow birch	30	2.6
Black spruce	22	2.8
Hemlock	13	11.7
Trembling aspen	13	6.0
Tree Layer (Mean % Cover)		**75**
Red maple	91	0.5
Balsam fir	87	2.4
Yellow birch	30	0.9
White birch	30	0.8
False holly	30	0.1
Wild raisin	30	0.1
Red spruce	22	0.8
Mountain-ash	22	0.3
Shrub Layer (Mean % Cover)		**4**
Evergreen wood fern	65	1.4
Starflower	61	1.0
Wild lily-of-the-valley	57	1.5
Bunchberry	52	1.6
Wood-sorrel	48	2.1
Goldthread	39	1.3
Sarsaparilla	35	0.4
Indian pipe	35	0.1
Painted trillium	26	0.1
Bluebead lily	22	0.4
Twinflower	22	0.3
Pink lady's slipper	22	0.1
Herb Layer (Mean % Cover)		**7**
Schreber's moss	96	30.1
Stair-step moss	87	22.0
Bazzania	87	5.8
Broom moss	83	3.1
Hypnum moss	52	1.9
Hair-cap moss	48	0.5
Wavy dicranum	35	2.3
Plume moss	26	0.5
Bryo-Lichen Layer (Mean % Cover)		**59**

Distinguishing Features

This softwood forest primarily of balsam fir usually follows a stand-level disturbance such as harvesting. This unit is not associated with coastal areas or the Cape Breton highland plateau.

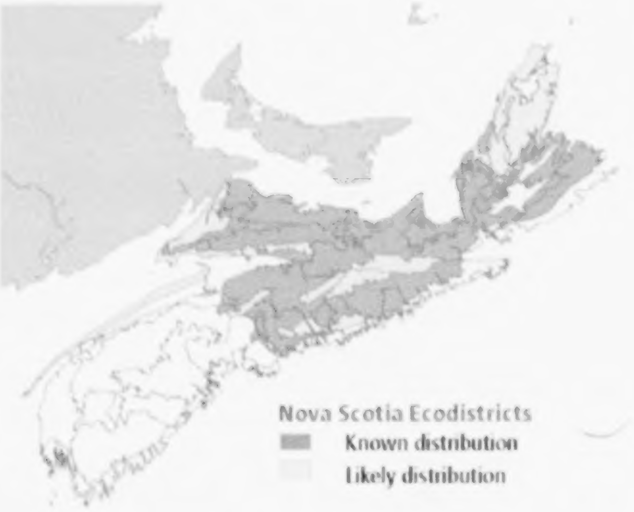
Ground hemlock (Yew)

Site Characteristics

Slope Position:	Upper^4 Level^7 Lower^7 Middle^1 Crest^1
Surface Stoniness:	(Non - Slightly)^6 (Moderately)^1 (Very - Excessively)^1
Bedrock Outcrop:	(Non-rocky)^9 (Slightly - Moderately)^1
Elevation Range:	23 - 226m
Slope Gradient:	Gentle^4 Level^7 Moderate^7 Other^1 nd^1
Aspect:	North^1 East^7 South^1 West^7 None^4
Exposure:	Moderate^5 Mod. exposed^1 Other^7
Microtopography:	Slightly^5 Moderately^1 Strongly^1 Other^1
Drainage:	Well^4 Moderately well^1 Imperfect^7 Other^1

Soil Characteristics

Soil Type:	ST2^5 ST3^7 ST2-L^1 ST3-L^1 ST6^1
Parent Material:	Glacial till^7 Glaciofluvial^7 Till/Bedrock^1
Rooting Depth (cm):	(<30)^2 (30-45)^4 (>45)^3 nd^1
Duff Thickness (cm):	(0-5)^7 (6-10)^5 (11-20)^2 nd^1



Mount Uniacke,
Hwy 101, Hants County

SH9

Balsam fir – Black spruce / Blueberry

Abies balsamea – Picea mariana / Vaccinium spp.

n=4

Concept: This early to mid-successional Vegetation Type (VT) has abundant balsam fir with minor coverage of black spruce, red maple and white pine. Due to the short-lived nature of balsam fir, this VT is often associated with significant coarse woody debris (CWD) and/or snags, as well as extensive balsam fir regeneration. Balsam fir – Black spruce / Blueberry usually follows stand-replacing disturbance events such as insect infestation, windthrow or harvesting.

Vegetation: Balsam fir is the dominant overstory tree along with varying amounts of black spruce, hybrid (red/black) spruce, red maple and white pine. White pine residuals can also be found in a super canopy. Understory layers have low species diversity, with the shrub layer providing the greatest coverage (mostly regenerating balsam fir, red maple and black spruce along with velvet-leaf blueberry and lambkill). Bracken and bunchberry are the most abundant herbs with Schreber's moss and stair-step moss the dominant bryophytes. Coverage of bazzania is influenced by the amount of CWD.

Environmental Setting: SH9 is mainly associated with dry to fresh, nutrient poor soils of glacial origin. These soils are generally medium to coarse textured and often very stony. This VT is found throughout Nova Scotia, but is most common in the western ecoregion.

Successional Dynamics: SH9 is a predominantly even-aged, early to mid-successional VT dominated by balsam fir. This VT usually follows stand-replacing disturbances such as insect infestation, windthrow or harvesting. In the absence of disturbances that promote balsam fir cover, SH9 can succeed to SP4 (White pine / Blueberry / Bracken) and SP5 (Black spruce / Lambkill / Bracken) on poorer sites and to SH4 (Red spruce – White pine / Lambkill / Bracken) on more zonal sites.

Ecological Features

This closed canopy forest occurs as small to large patches within broader spruce-fir matrix forests. The short life-span of balsam fir contributes substantial coarse woody material to the ecosystem, often occurring in pulses following insect outbreaks, disease or destructive wind storms. Balsam fir is very shade-tolerant, regenerating well in the understory. On moist sites black spruce typically regenerates by layering, forming small clonal groups. Mature forests may provide habitat for red and flying squirrels, deer, moose, salamanders, songbirds and small mammals, among other groups of wildlife. Old man's beard lichen is often abundant in old forests, providing important food and nest material. No plant or lichen species of conservation concern were found in available plot data.

Characteristic Plants

	SH9	
	Freq. (%)	*Cover (%)*
Balsam fir	100	43.0
Black spruce	75	12.7
Red maple	75	7.3
White pine	75	3.3
White birch	50	3.0
Yellow birch	25	5.0
Red spruce	25	3.0
Tree Layer (Mean % Cover)		**64**
Red maple	100	2.2
Velvet leaf blueberry	75	5.7
Lambkill	75	2.6
Balsam fir	75	2.1
Black spruce	75	0.4
False holly	75	0.2
White pine	50	0.1
Yellow birch	50	0.1
Red spruce	25	3.0
Wild raisin	25	0.3
Huckleberry	25	0.2
Lowbush blueberry	25	0.1
Red oak	25	0.1
Serviceberry	25	0.1
Shrub Layer (Mean % Cover)		**12**
Bracken	75	11.3
Bunchberry	75	2.8
Starflower	75	0.7
Wild lily of the valley	75	0.7
Bluebead lily	50	0.5
Twinflower	50	0.3
Hay scented fern	50	0.2
Mayflower	50	0.1
Partridge-berry	50	0.1
Goldthread	25	8.0
New York fern	25	1.0
Cinnamon fern	25	0.1
Indian cucumber root	25	0.1
Indian pipe	25	0.1
Interrupted fern	25	0.1
Painted trillium	25	0.1
Shinleaf	25	0.1
Herb Layer (Mean % Cover)		**15**
Schreber's moss	100	59.5
Bazzania	100	12.0
Stair-step moss	100	8.0
Ladies' tresses	75	2.2
Wavy dicranum	75	1.4
Plume moss	50	0.4
Hair cap moss	25	3.0
Russ's sphagnum	25	2.5
Broom moss	25	2.0
Hypnum moss	25	2.0
Pale fat-leaved sphagnum	25	0.3
Grey reindeer lichen	25	0.3
Common green sphagnum	25	0.1
Bryo-Lichen Layer (Mean % Cover)		**85**

Distinguishing Features

This balsam fir softwood forest occurs on well drained, nutrient poor soils. Black spruce and hybridized spruce are common with white pine often in a super canopy. Bracken is the most abundant herb.

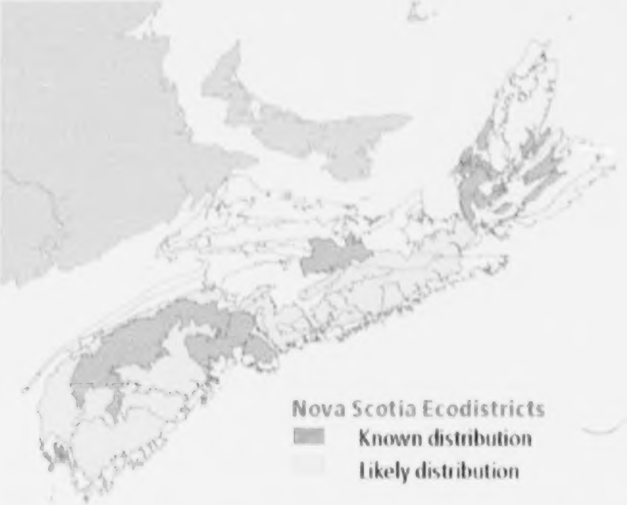
Broom moss

Site Characteristics

Slope Position:	Middle^{5} Level^{3} Upper^{2}
Surface Stoniness:	(Very - Excessively)^{5} (Non - Slightly)^{3} (Moderately)^{2}
Bedrock Outcrop:	(Non-rocky)^{7} (Slightly - Moderately)^{3}
Elevation Range:	37 - 198m
Slope Gradient:	Level^{5} Gentle^{5}
Aspect:	West^{5} None^{2} nd^{3}
Exposure:	Moderate^{7} Exposed^{3}
Microtopography:	Slightly^{6} Level^{2} Moderately^{2}
Drainage:	Well^{4} Imperfect^{3} Moderately well^{3}

Soil Characteristics

Soil Type:	ST15^{4} ST2^{3} ST3^{3}
Parent Material:	Glacial till^{8} Till/Bedrock^{2}
Rooting Depth (cm):	(<30)^{3} (30-45)^{7}
Duff Thickness (cm):	(6-10)^{3} (11-20)^{7}



Nova Scotia Ecodistricts

▨ Known distribution

☐ Likely distribution

Georgeville, Antigonish County

SH10

White spruce – Balsam fir / Broom moss

Picea glauca – Abies balsamea / Dicranum scoparium

n=3

Concept: This mid successional Vegetation Type (VT) has an overstory of white spruce and balsam fir along with a component of white birch (its relative abundance reflects time since disturbance). The absence of white spruce in the understory suggests this species will not form a significant part of later successional stages. White spruce – Balsam fir / Broom moss usually follows stand-replacing disturbance events such as insect infestation, windthrow or harvesting.

Vegetation: White spruce, balsam fir and white birch are the main overstory trees, but stands may also contain minor amounts of red maple and yellow birch. The shrub layer is completely made up of regenerating tree species, especially balsam fir. Both the herb and bryophyte layers have low species diversity and abundance. Typical upland forest flora are present including wild lily-of-the-valley, bunchberry, Schreber's moss and wavy dicranum.

Environmental Setting: SH10 is mainly associated with fresh to fresh-moist, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured. This VT is most common in eastern Nova Scotia, particularly the Eastern Interior ecodistrict where white spruce often replaces red spruce in spruce-fir stands.

Successional Dynamics: SH10 is a predominantly even-aged, mid-successional VT dominated by white spruce and balsam fir. This VT usually follows stand-replacing disturbances from insect infestation, windthrow or harvesting. Early successional stages may have an increased proportion of white birch. In the absence of stand-level disturbance, white spruce and balsam fir in this VT will eventually succumb to agents such as bark beetle, tussock moth and disease allowing red maple and yellow birch to increase in dominance. Possible later successional VTs include MW1 (Red spruce – Yellow birch / Evergreen wood fern) and TH7 (Yellow birch – White birch / Evergreen wood fern).

Ecological Features

This is a large patch closed canopy forest with limited distribution in eastern Nova Scotia. Balsam fir is very shade-tolerant and capable of regenerating extensively in the understory, while white spruce is slightly less tolerant. Mature forests may provide habitat for red squirrels and flying squirrels. South facing slopes may provide winter cover for deer. Understory fir snags are favoured habitat for small cavity nesting songbirds. Young forests are preferred habitat for snowshoe hare. These forests may support abundant fruiting of mycorrhizal mushrooms, including chanterelles and boletes. No plant or lichen species of conservation concern were found in available plot data.

Characteristic Plants	SH10 Freq. (%)	SH10 Cover (%)
White spruce	100	33.0
White birch	100	9.7
Balsam fir	67	50.0
Red maple	33	10.0
Trembling aspen	33	8.0
Black spruce	33	7.0
Large-tooth aspen	33	4.0
Yellow birch	33	3.0
Tamarack	33	0.1
Tree Layer (Mean % Cover)		**87**
Red maple	100	0.4
Balsam fir	67	4.0
White birch	67	4.0
White spruce	33	2.0
Silver poplar	33	1.0
Trembling aspen	33	1.0
Mountain ash	33	0.5
White ash	33	0.5
Yellow birch	33	0.1
Shrub Layer (Mean % Cover)		**7**
Wild lily of the valley	67	8.5
Bunchberry	67	5.5
Bracken	67	0.5
Starflower	67	0.5
Indian pipe	67	0.3
Goldthread	67	0.1
Sarsaparilla	33	3.0
Twinflower	33	1.0
Wood aster	33	1.0
Eastern spreading wood fern	33	0.5
Hawkweeds	33	0.3
Running club-moss	33	0.3
Cinnamon fern	33	0.1
Creeping snowberry	33	0.1
Evergreen wood fern	33	0.1
Ground pine	33	0.1
New England sedge	33	0.1
Herb Layer (Mean % Cover)		**13**
Schreber's moss	100	12.2
Broom moss	100	0.8
Hair-cap moss	67	1.5
Wavy dicranum	67	1.5
Hypnum moss	67	1.1
Stair-step moss	33	37.0
Plume moss	33	2.0
Grey reindeer lichen	33	1.0
Bazzania	33	0.8
Fern moss	33	0.1
Pin cushion moss	33	0.1
Shaggy moss	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**29**

Distinguishing Features

White spruce growing with balsam fir and lesser white birch is diagnostic of this softwood forest usually found in eastern Nova Scotia.

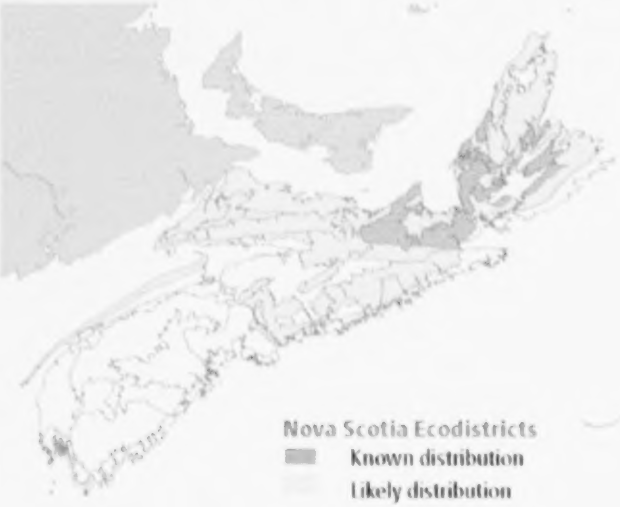
Partridge-berry

Site Characteristics

Slope Position: Upper^{3} Middle^{3} Lower^{3}
Surface Stoniness: (Non - Slightly)^{10}
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 100 - 159m
Slope Gradient: Gentle^{10}
Aspect: North^{7} South^{3}
Exposure: Moderate^{7} Mod. exposed^{3}
Microtopography: Moderately^{7} Slightly^{3}
Drainage: Moderately well^{7} Well^{3}

Soil Characteristics

Soil Type: ST2-L^{3} ST3^{3} ST5^{3}
Parent Material: Glacial till^{10}
Rooting Depth (cm): (<30)^{3}(30-45)^{3}(>45)^{3}
Duff Thickness (cm): (6-10)^{7}(11-20)^{3}



Nova Scotia Ecodistricts

▨ Known distribution
□ Likely distribution

SP Spruce Pine Forest Group

(n = 177)

SP1	Jack pine / Bracken – Teaberry	**SP1a**	Black spruce variant
SP2	Red pine / Blueberry / Bracken	**SP2a**	Black spruce variant
SP3	Red pine – White pine / Bracken – Mayflower	**SP3a**	Black spruce variant
SP4	White pine / Blueberry / Bracken	**SP4a**	Black spruce variant
		SP4b	Huckleberry variant
SP5	Black spruce / Lambkill / Bracken		
SP6	Black spruce – Red maple / Bracken – Sarsaparilla		
SP7	Black spruce / False holly / Ladies' tresses sphagnum		
SP8	Black spruce – Aspen / Bracken – Sarsaparilla		
SP9	Red oak – White pine / Teaberry		
SP10	Tamarack / Wild raisin / Schreber's moss		

Concept: These are nutrient poor forest ecosystems often associated with fire disturbance. They are generally dominated by black spruce and pines with an understory of plants tolerant of acidic (nutrient poor) soils. Soils and sites are often very to excessively stony, especially when associated with granitic glacial till deposits. Soil moisture deficits are also common on many sites. All Vegetation Types (VT) in this group are found in the Acadian Ecosite group, with several also found in the Maritime Boreal Ecosite group.

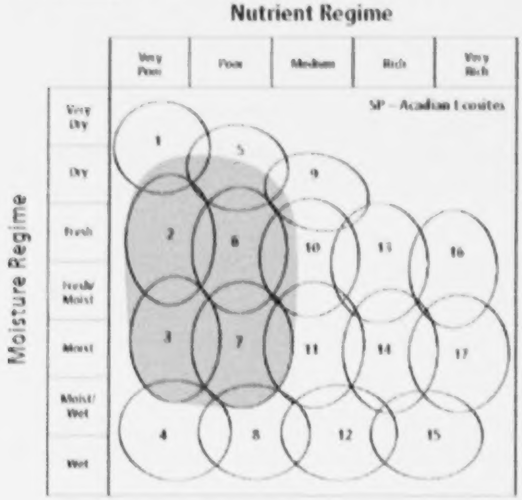
Vegetation: Crown closure can vary within and between VTs of this group. Black spruce and pines (white, red, jack) are the main overstory species. Red oak is also commonly associated with white pine in western Nova Scotia. The shrub layer is usually dominated by ericaceous species such as lambkill, blueberry and huckleberry along with black spruce regeneration (often through layering). Herb cover is dependent on the amount of light reaching the ground, but bracken and teaberry are almost always present. Bryophyte/lichen coverage is usually moderate to extensive and includes Schreber's moss and broom moss. Reindeer lichens can be abundant on drier sites.

Environmental Setting: Vegetation types in this group are found on a range of slope positions, and are often associated with shallow soils on bedrock ridges and outcrops. Soils are mainly derived from coarse textured glacial till or glaciofluvial deposits. A wide range of moisture levels can be found, but fertility is generally low throughout.

This group is found throughout the province, but is less prominent in the Nova Scotia Uplands (300), Cape Breton Highlands (200) and Cape Breton Taiga (100) ecoregions.

Successional Dynamics: Spruce Pine VTs cover a range of successional stages, but all lead to an edaphic climax dominated by black spruce. Frequent natural disturbances include fire and windthrow. Stand-level disturbances are often intense leaving only scattered residuals, particularly fire-scarred pine. As the interval between stand-level disturbances increases, so does content of black spruce and/or white pine. If fire is restricted from the disturbance regime, the occurrence of red and jack pine ecosystems may decrease.

Edatopic Grids


Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
SP – Acadian Ecosites
Moisture Regime
Very Dry
Dry
Fresh
Fresh/Moist
Moist
Moist/Wet
Wet
1
5
9
2
6
10
13
16
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11
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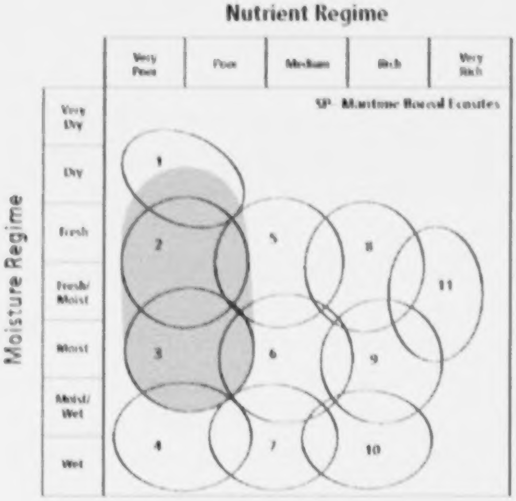

Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
SP- Maritime Boreal Ecosites
Moisture Regime
Very Dry
Dry
Fresh
Fresh/Moist
Moist
Moist/Wet
Wet
1
2
5
8
11
3
6
9
4
7
10

Ecological Features

Forests in this group occur as small to large patches or matrix forests on sites that are nutrient poor and prone to seasonal drying. They are often associated with barrens, ericaceous vegetation, reindeer lichen and/or crowberry vegetation. Historically, wildfire was the predominant disturbance agent in these forests, at stand and landscape scales. Burn intensities varied greatly, ranging from severe crown to low intensity ground fires, each strongly shaping canopy and understory structure. Fires ensured these forests were maintained at early to mid successional stages, with open or closed canopies. Depending on burn intensity and fire return interval, post-fire stands may be simple and even aged, or more complex with uneven aged canopies, fire scarred trees, legacy patches and large deadwood. Ericaceous shrubs, especially lambkill, create thick duff layers with allelopathic properties (chemical interference with growth and germination) and an aggressive vegetative growth, limit black spruce regeneration on many sites. Productivity and species richness are generally low, but these forests can support several faunal and fungal species. Fire suppression is reducing the fundamental process supporting many VTs in this group.

Chase Lake,
Cumberland County

SP1

Jack pine / Bracken – Teaberry

Pinus banksiana / Pteridium aquilinum – Gaultheria procumbens

SP1a

Black spruce variant

Picea mariana

n=15

Concept: This early successional Vegetation Type (VT) has abundant jack pine, lesser but frequent black spruce, and a small suite of shade-intolerant understory associates. Occurrences dominated by black spruce, with lesser jack pine, are defined by the SP1a variant. SP1a stands either occur at a later successional stage or are characterized by less jack pine at the time of stand establishment. SP1 (Jack pine / Bracken – Teaberry) usually follows stand-replacing disturbance events such as fire or harvesting.

Vegetation: Jack pine is typically the dominant overstory tree, with lesser amounts of black spruce and shade intolerant hardwood species. The shrub layer may be densely occupied by black spruce and ericaceous species such as lambkill, lowbush blueberry and rhodora. (The presence of rhodora is particularly indicative of low site fertility). Herb layer diversity is low and dominated by bracken and teaberry. Schreber's moss dominates the bryophyte layer, with patches of reindeer lichens in more open areas.

Environmental Setting: SP1 occurs on dry, nutrient very poor to poor soils associated with glaciofluvial deposits or shallow, gravelly and/or coarse textured glacial tills. The majority of this VT is found in the Cumberland County portion of the Northumberland Lowlands ecodistrict. The black spruce variant can be found scattered throughout the Eastern and Atlantic Coastal ecoregions and is often interspersed with OW1 (Jack pine / Huckleberry – Black crowberry) on hummocky topography. This VT is more common in New Brunswick but mostly localized to the northeast. It is rare on Prince Edward Island.

Successional Dynamics: Dry, nutrient poor soils and stand-replacing disturbances strongly shape both the canopy structure and successional patterns of SP1. Historically SP1 stands originated from high intensity fires that initiated new, even-aged stands dominated by jack pine. The presence of jack pine decreases between disturbance events as it is replaced by black spruce (a species which has both greater longevity and the flexibility to regenerate either by seed or vegetative layering). As the potential impacts of fire are reduced through management, white pine and black spruce dominance will increase and the stand could transition to SP4a (White pine / Blueberry / Bracken variant Black spruce) or directly to SP5 (Black spruce / Lambkill / Bracken), the edaphic climax for this successional pathway.

Ecological Features

This closed canopy forest occurs as small to large patches. Jack pine is a shade-intolerant, fire-dependent species. This feature of the tree's life history means that fire suppression practices will likely reduce the abundance and frequency of this ecosystem in the landscape. Fire scars on residual pine are often found scattered through SP1 stands. Jack pine retains most of its seed in tightly closed cones that open to release large seed crops, after they are heated by fire. The acidity (low nutrient content) of the forest floor, due to the abundance of pine needles and ericaceous vegetation, reduces soil fauna, plant diversity, and vertebrate diversity and abundance. However, needles are an important food source for spruce grouse.

Characteristic Plants	SP1		SP1a	
	Freq. (%)	*Cover (%)*	*Freq. (%)*	*Cover (%)*
Jack pine	100	40.1	100	21.4
Black spruce	63	6.2	100	37.6
Red pine	38	2.0	43	0.1
Red maple	25	2.5	14	5.0
White birch	25	0.5	14	0.1
White pine			43	10.3
Tree Layer (Mean % Cover)		**47**		**64**
Lambkill	100	38.3	100	14.3
Black spruce	100	3.7	100	5.7
Lowbush blueberry	88	12.8	86	2.1
Wild raisin	88	0.1	71	1.1
Red maple	63	1.5	86	2.1
Rhodora	50	27.8	14	20.0
Velvet-leaf blueberry	50	18.3	29	8.5
False holly	50	0.2	43	0.9
Grey birch	50	0.2		
Serviceberry	38	0.3	29	0.3
Huckleberry	25	5.0	14	0.1
White pine	25	0.3	57	0.2
Sweetfern	25	0.1		
Balsam fir	13	0.1	43	0.8
White birch			29	0.1
Shrub Layer (Mean % Cover)		**77**		**31**
Teaberry	100	13.6	71	2.3
Bracken	63	24.2	86	25.7
Mayflower	63	0.1	57	0.3
Bunchberry	38	1.1	57	0.5
Pink lady's slipper	25	0.8	43	0.1
Painted trillium	13	0.1	29	0.3
Creeping snowberry			29	1.3
Herb Layer (Mean % Cover)		**30**		**25**
Schreber's moss	100	41.3	100	81.7
Grey reindeer lichen	88	3.0	57	1.1
Wavy dicranum	75	1.8	100	3.8
Star-tipped reindeer lichen	38	12.0	14	0.1
Hair-cap moss	25	2.0	71	0.1
Broom moss	25	1.0	29	1.0
Cup lichens	25	0.1	57	0.1
Plume moss	25	0.1	29	0.2
Dicranums	13	0.1	29	0.8
Stair-step moss	13	0.1	57	1.6
Hypnum moss			57	0.3
Naugehyde liverwort			43	1.5
Ladies' tresses			29	5.0
Bryo-Lichen Layer (Mean % Cover)		**53**		**91**

Distinguishing Features

Jack pine is diagnostic for this vegetation type found on dry, poor soils. Ericaceous species such as lambkill, blueberry and rhodora are common. Reindeer mosses are common. The variant SP1a is dominated by black spruce with lesser jack pine.

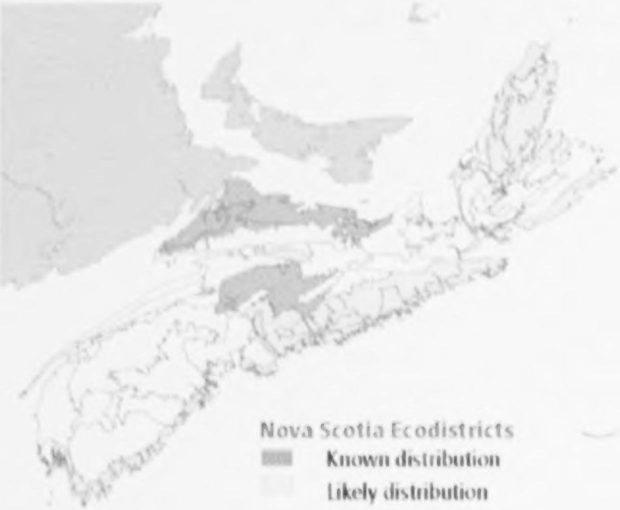
Teaberry

Site Characteristics

Slope Position: Upper^6 Level^2 Crest^1 Middle^1
Surface Stoniness: (Non - Slightly)^8 (Moderately)^1 nd^1
Bedrock Outcrop: (Non-rocky)^9 nd^1
Elevation Range: 21 - 82m
Slope Gradient: Gentle^6 Level^2 nd^2
Aspect: East^2 South^1 West^3 None^3 nd^1
Exposure: Moderate^8 Mod. exposed^1 nd^1
Microtopography: Slightly^4 Moderately^3 Level^1 Strong^1 nd^1
Drainage: Moderately well^3 Rapid^3 Well^3 nd^1

Soil Characteristics

Soil Type: ST2^4 ST1^3 ST3^2 nd^1
Parent Material: Glacial till^9 Glaciofluvial^1
Rooting Depth (cm): (30-45)^2 (>45)^7 nd^1
Duff Thickness (cm): (0-5)^1 (6-10)^6 (11-20)^2 nd^1



Aldershot, Kings County

SP2

Red pine / Blueberry / Bracken

Pinus resinosa / Vaccinium spp. / Pteridium aquilinum

SP2a

Black spruce variant

Picea mariana

n=25

Concept: This early to mid-successional Vegetation Type (VT) has significant red pine in the overstory and black spruce in one or more layers. Occurrences dominated by black spruce with lesser red pine are defined by the SP2a variant. These variant stands either occur at a later successional stage or are characterized by less red pine at the time of stand establishment. SP2 is similar to SP3 (Red Pine – White pine / Bracken – Mayflower), but is distinguished by the nearly homogeneous overstory of red pine. SP2 usually follows stand-replacing disturbance events such as fire or harvesting.

Vegetation: Red pine is typically the dominant overstory tree, although black spruce cover can be significant. The shrub layer consists mainly of ericaceous species such as lambkill, velvet-leaf blueberry and lowbush blueberry, along with wild raisin. Black spruce and red maple regeneration can also be extensive. Herb layer diversity is low, typically dominated by bracken and teaberry. Abundant Schreber's moss characterizes the bryophyte layer, but a needle carpet can also be found in dense stands.

Environmental Setting: SP2 occurs on dry to moist, nutrient very poor to poor soils. Drier sites are generally associated with glaciofluvial deposits or shallow, gravelly and/or coarse textured glacial tills found in the Western ecoregion. Moist sites are mainly associated with finer textured soils (e.g. sandy clay loam) found in the Central Lowlands and Northumberland Lowlands ecodistricts. SP2 may be interspersed with OW3 (Red pine / Broom crowberry / Reindeer lichen) in some areas. This VT is very rare on Prince Edward Island and somewhat uncommon in New Brunswick.

Successional Dynamics: Dry, nutrient poor soils and stand-replacing disturbances strongly shape both the canopy structure and successional patterns of SP2. Historically SP2 stands originated from a few residual trees that survived high intensity fires. (Fire scars can often be found on the older trees at a site). Occasional, low intensity fires would have maintained red pine presence by eliminating or reducing undergrowth competition. SP2 stands are predominantly even-aged until red pine succumbs to senescence and is gradually replaced by black spruce, balsam fir, red oak and/or white pine. Dominance of these latter tree species increases over time, especially as the potential impacts of fire are reduced through management. Later successional stages may include SP4 (White pine / Blueberry / Bracken) or advance directly to SP^5 (Black spruce / Lambkill / Bracken), the edaphic climax for this successional pathway.

Ecological Features

This closed canopy forest occurs as small to large patches. Red pine is shade-intolerant and usually requires fire to regenerate to near-pure forests. As such, fire suppression practices may reduce the abundance of this ecosystem. Fire scars on residual pine are often found scattered through SP2 stands and can lead to the formation of hollow trunks. The acidity (low nutrient content) of the forest floor (due to the abundance of pine needles and ericaceous vegetation) reduces soil fauna, plant diversity, and vertebrate diversity and abundance. Seeds of red pine may provide food for pine siskins, nuthatches and chickadees. Saffron milkcap is a well-known edible mushroom that forms a mycorrhizal relationship with red pine.

Characteristic Plants

	SP2		SP2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red pine	100	64.5	100	27.0
Black spruce	53	9.8	100	33.3
White pine	53	3.6	40	5.5
Red maple	33	2.6	30	1.7
Large-tooth aspen	20	3.3		
White birch	20	0.1		
Jack pine	13	3.0	20	4.0
Balsam fir	7	4.0	20	7.5
Tamarack	7	0.1	20	2.5
Tree Layer (Mean % Cover)		**74**		**66**
Red maple	87	2.0	90	3.0
Black spruce	80	9.2	100	6.7
Velvet-leaf blueberry	80	7.3	80	12.4
Lambkill	73	12.3	100	20.3
Serviceberry	73	0.5	60	0.1
Wild raisin	67	1.2	80	1.0
White pine	60	0.1	30	0.1
Lowbush blueberry	53	2.2	70	5.1
Red oak	40	0.1	20	0.1
Rhodora	33	5.6	40	2.5
Balsam fir	33	2.2	30	2.0
Huckleberry	33	1.2	20	2.1
False holly	27	1.4	50	2.4
Grey birch	13	0.5	40	0.1
Labrador tea	13	0.1	20	2.5
Shrub Layer (Mean % Cover)		**30**		**49**
Bracken	87	20.2	90	33.9
Teaberry	73	1.3	90	2.1
Bunchberry	53	5.8	80	12.8
Wild lily-of-the-valley	47	3.1	20	0.3
Mayflower	47	0.2	60	1.3
Sarsaparilla	33	0.2		
Pink lady's slipper	33	0.1	30	0.1
Cow-wheat	27	0.1	30	0.2
Partridge-berry	27	0.1	20	0.1
Starflower	27	0.1	30	0.1
False violet	13	0.1	40	0.2
Indian pipe	13	0.1	20	0.1
Painted trillium	13	0.1	20	0.1
Goldthread	7	0.1	30	0.6
Herb Layer (Mean % Cover)		**24**		**40**
Schreber's moss	87	27.8	100	64.7
Wavy dicranum	87	4.9	100	3.3
Bazzania	33	0.7	30	1.1
Hypnum moss	27	0.3		
Broom moss	27	0.1	30	0.3
Stair-step moss	20	1.7	30	4.7
Ladies' tresses	20	0.4	50	2.2
Grey reindeer lichen	13	0.1	60	0.7
Cup lichens	7	0.1	20	0.3
Flat-topped sphagnum			20	1.5
Bryo-Lichen Layer (Mean % Cover)		**30**		**72**

Distinguishing Features

Red pine is diagnostic for this vegetation type found with scattered black spruce. Ericaceous species such as lambkill, blueberry and rhodora are common. In the variant, SP2a, black spruce is co-dominant with red pine. A needle carpet condition exists in stands with closed canopies.

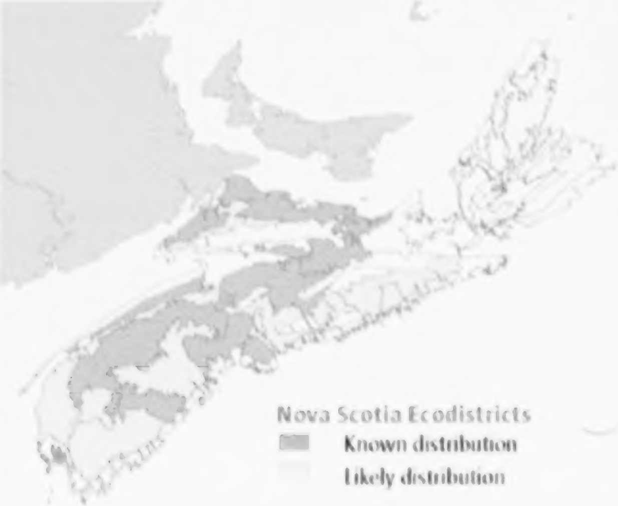
Bracken

Site Characteristics

Slope Position: Level³ Upper³ Middle² Other²
Surface Stoniness: (Non - Slightly)⁸ (Moderately)¹ (Very - Excessively)¹
Bedrock Outcrop: (Non-rocky)¹⁰
Elevation Range: 9 - 199m
Slope Gradient: Gentle⁵ Level³ Moderate¹ nd¹
Aspect: North² East² South² West² None²
Exposure: Moderate¹⁰
Microtopography: Slightly⁶ Moderately² Level¹ Strongly¹
Drainage: Well⁴ Imperfect² Moderately well² Rapid²

Soil Characteristics

Soil Type: ST1⁴ ST2⁴ Other²
Parent Material: Glacial till⁶ Glaciofluvial³ Till/Bedrock¹
Rooting Depth (cm): (<30)⁴ (30-45)¹ (>45)⁴ nd¹
Duff Thickness (cm): (0-5)¹ (6-10)⁴ (11-20)⁴ nd¹



Tuskapeake Brook, Annapolis County

SP3

Red Pine – White pine / Bracken – Mayflower

Pinus resinosa – Pinus strobus / Pteridium aquilinum – Epigaea repens

SP3a

Black spruce variant

Picea mariana

n=13

Concept: This early to mid-successional Vegetation Type (VT) has an overstory dominated by both red and white pine. Occurrences co-dominated by black spruce and pine are defined by the SP3a variant. Red Pine – White pine / Bracken – Mayflower usually follows stand replacing disturbance events such as fire or harvesting.

Vegetation: Red and white pine are the dominant overstory trees, usually occurring in similar amounts. Black spruce is the third most common species, with the occasional presence of red maple, large-tooth aspen and red oak. The shrub layer consists mainly of ericaceous species such as lambkill, velvet leaf blueberry and lowbush blueberry, along with wild raisin. Black spruce and balsam fir regeneration can also be extensive in some stands. Herb layer diversity is relatively low, characterized by species such as pink lady's slipper, mayflower, starflower, bunchberry and sarsaparilla. Bryophyte cover is usually low except in the black spruce variant (SP3a) where heavy cover of Schreber's moss, broom moss and wavy dicranum is common. In dense stands, the forest floor may also be dominated by a needle carpet.

Environmental Setting: SP3 mainly occurs on dry to fresh, nutrient very poor to poor soils. This VT is found throughout mainland Nova Scotia, especially in the Western ecoregion, lowland ecodistricts along the Minas Basin, Annapolis Valley and Northumberland shore. This VT is very rare on Prince Edward Island, and somewhat uncommon in New Brunswick.

Successional Dynamics: Dry, nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and successional patterns. Historically, SP3 stands originated from fire disturbance creating mainly even-aged stands. As the potential impacts of fire are reduced through management white pine and black spruce will increase in dominance, possibly shifting SP3 to SP4 (White pine / Blueberry / Bracken) or directly to SP5 (Black spruce / Lambkill / Bracken), the edaphic climax for this successional pathway.

Ecological Features

This closed or open canopy forest occurs as large patches. Red pine is a shade-intolerant, fire-adapted species whose persistence in this ecosystem will be promoted by fire. Fire scars on residual pine are often found scattered through SP3 stands. White pine is a long-lived species of the Acadian Forest and, as one of the region's largest trees, may provide valuable wildlife habitat for cavity nesting birds such as owls and woodpeckers and mammals such as fishers and porcupines. The acidity (low nutrient content) of the forest floor (due to the abundance of pine needles and ericaceous vegetation) reduces soil fauna, plant diversity, and vertebrate diversity and abundance. Seeds of red pine may provide food for pine siskins, nuthatches and chickadees. Saffron milkcap, is a well known edible mushroom that forms a mycorrhizal relationship with red pine.

Characteristic Plants

	SP3		SP3a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red pine	100	32.1	100	15.0
White pine	100	31.4	100	15.0
Red oak	50	7.5		
Red maple	50	6.5	60	3.3
Black spruce	50	5.8	80	30.8
Large-tooth aspen	50	5.8		
White birch	25	3.5	20	7.0
Grey birch	13	2.0	20	2.0
Red spruce	13	2.0	20	12.0
Trembling aspen			20	12.0
Balsam fir			20	10.0
Tree Layer (Mean % Cover)		**78**		**65**
Red maple	100	2.7	80	1.0
Lambkill	100	2.0	100	5.6
White pine	88	1.1	60	0.4
Velvet-leaf blueberry	75	4.3	80	8.9
Balsam fir	75	4.1	80	8.0
Black spruce	63	8.0	60	6.3
Lowbush blueberry	50	9.3	60	0.8
Wild raisin	50	1.7	100	0.1
Red oak	50	1.5	40	0.1
Serviceberry	38	0.1	80	0.1
Huckleberry	25	5.0	60	5.7
Smooth serviceberry	25	3.5		
Red spruce	25	2.1	20	1.0
Grey birch	25	0.6	20	0.1
Sweetfern	25	0.1		
White birch	25	0.1	20	2.0
False holly	13	0.1	60	2.2
Rhodora			40	0.5
Shrub Layer (Mean % Cover)		**27**		**31**
Bracken	100	17.7	100	25.2
Starflower	88	1.4	100	0.4
Teaberry	75	5.0	60	1.4
Wild lily-of-the-valley	63	4.8	60	10.2
Bunchberry	63	3.5	80	2.6
Sarsaparilla	63	2.1	60	1.0
Mayflower	63	1.1	80	0.8
Partridge berry	63	0.2		
Indian pipe	50	0.1	40	0.1
Pink lady's slipper	50	0.1	80	0.1
Rice grass	38	0.5		
Round-leaved pyrola	38	0.1		
Cow wheat	25	0.1	20	0.1
Painted trillium	25	0.1	60	0.1
Princes' pine	25	0.1		
Interrupted fern			40	0.5
Herb Layer (Mean % Cover)		**31**		**38**
Schreber's moss	75	17.2	100	51.8
Wavy dicranum	63	1.2	80	3.4
Broom moss	50	0.8	60	0.6
Bazzania	50	0.5	80	0.8
Hypnum moss	38	1.8	60	8.0
Grey reindeer lichen	38	0.9	40	5.5
Stair-step moss	13	2.0	80	1.6
Hair-cap moss	13	0.5	40	3.3
Ladies' tresses			60	0.3
Bryo-Lichen Layer (Mean % Cover)		**16**		**68**

Distinguishing Features

Both red pine and white pine need to be present to classify this softwood forest found on dry, nutrient poor soils. The variant SP3a has black spruce co-dominant with the pines.

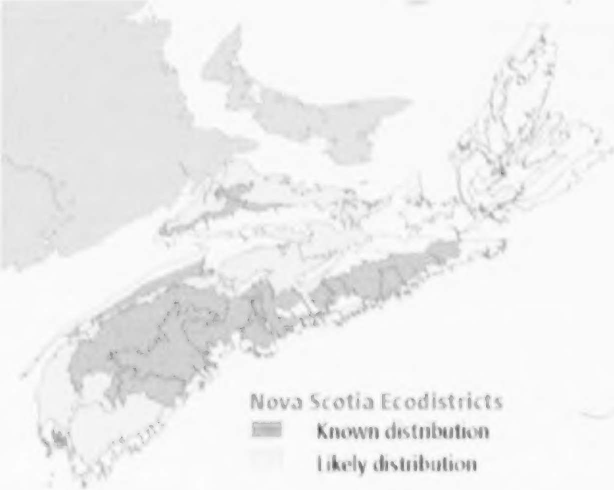
Mayflower

Site Characteristics

Slope Position:	Crest^{1} Level^{1} Upper^{1} Middle^{1}
Surface Stoniness:	(Very - Excessively)^{1} (Moderately)^{1} (Non - Slightly)^{2} nd^{7}
Bedrock Outcrop:	(Non rocky)^{5} (Slightly - Moderately)^{7} (Very-Excessively)^{1} nd^{7}
Elevation Range:	37 - 223m
Slope Gradient:	Level^{5} Gentle^{1} nd^{7}
Aspect:	North^{1} East^{1} South^{2} West^{1} None^{5}
Exposure:	Moderate^{8} Mod. exposed^{1} nd^{1}
Microtopography:	Slightly^{4} Moderately^{3} Level^{1} nd^{7}
Drainage:	Well^{5} Imperfect^{1} Moderately well^{1} Rapid^{1} nd^{7}

Soil Characteristics

Soil Type:	ST2^{5} ST1^{1} ST3-G^{1} ST15^{1} nd^{7}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^{1} (30-45)^{7} (>45)^{3} nd^{4}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{3} (11-20)^{3} nd^{3}



Northeast Lake,
Queens County

SP4

White pine / Blueberry / Bracken

Pinus strobus / Vaccinium spp. / Pteridium aquilinum

SP4a

Black spruce variant

Picea mariana

SP4b

Huckleberry variant

Gaylussacia baccata

n=47

Concept: This mid-successional Vegetation Type (VT) has abundant white pine, lesser but frequent black spruce and a small suite of shade-intolerant understory associates. In many stands, large diameter residual white pine are also present, having survived a previous disturbance or harvest. There are two variants: SP4a where black spruce is dominant in the overstory and SP4b where huckleberry is dominant in the understory. White pine / Blueberry / Bracken usually follows stand-replacing disturbance events such as fire or harvesting.

Vegetation: White pine is the dominant overstory tree (often in a super canopy position), along with frequent black spruce. Balsam fir, if present, is limited to the understory and is often damaged by balsam fir woolly adelgid (especially in western Nova Scotia). The shrub layer may be densely occupied by ericaceous species such as lambkill, velvet-leaf blueberry and lowbush blueberry, along with wild raisin and black spruce. Herb layer diversity is relatively low, characterized by species such as bracken, mayflower, teaberry, sarsaparilla and pink lady's slipper. Bryophyte cover is often extensive and includes Schreber's moss, broom moss and wavy dicranum.

Environmental Setting: SP4 occurs on dry to fresh-moist nutrient poor soils. The deep rooting capability of white pine allows this species to access moisture on sites where water deficits occur during the growing season. This VT is usually associated with granitic tills in western Nova Scotia, but can be found scattered throughout the province wherever similar soil types occur. In north central Nova Scotia, SP4 can also be found on finer textured soils. This VT is very rare on Prince Edward Island but relatively common in New Brunswick.

Successional Dynamics: Relatively dry, nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and successional patterns. Historically SP4 stands originated from fire disturbance and are typically even-aged, although scattered white pine can be significantly older due to this species' greater longevity and resistance to windthrow and fire. Earlier successional stages may include a jack pine (SP1) or red pine (SP2) component. Between stand-level disturbance events, senescence and patch disturbances create opportunities for balsam fir, black spruce, red maple, red oak and white birch. This VT can persist for a relatively long time, but stands will eventually succeed to SP5 (Black spruce / Lambkill / Bracken), the edaphic climax for this successional pathway.

Ecological Features

This closed-canopy forest typically forms large patches or matrix ecosystems. White pine has intermediate shade tolerance and may form an understory of young cohorts in early successional red maple, white birch and aspen forests. This life history strategy may reduce tree deformation by the white pine weevil. White pine is a long-lived species (greater than 200 years) of the Acadian Forest and, as one of the region's largest trees, may provide valuable wildlife habitat for cavity nesting birds such as owls and woodpeckers and mammals such as fishers and porcupines. Older pines found in SP4 often have fire scars and frequently contain hollow trunks. Larger white pine may develop a super canopy, increasing susceptibility to lightning strikes, especially on higher relief. The acidity (low nutrient content) of the forest floor (due to the abundance of pine needles and ericaceous vegetation) reduces soil fauna, plant diversity, and vertebrate diversity and abundance. Following fire, the decay resistant snags may stand for many decades, providing perch and cavity sites in the new forest.

Characteristic Plants	SP4		SP4a		SP4b	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
White pine	100	58.5	100	10.7	100	37.3
Red maple	68	10.2	43	3.7	100	10.0
Black spruce	53	11.6	100	35.7	57	6.3
Red oak	37	3.4	4	3.0	57	7.3
Balsam fir	26	14.0	65	12.2	14	15.0
White birch	26	6.0	30	0.7	57	4.8
Red spruce	16	7.3	17	18.3		
Red pine	16	5.7	17	3.8	86	9.3
Large-tooth aspen	11	1.5	4	0.1	71	7.8
Grey birch	11	0.1	13	2.7	14	0.1
Tamarack			13	1.7		
Tree Layer (Mean % Cover)		**80**		**61**		**74**
Red maple	89	3.7	78	0.5	100	3.1
Balsam fir	79	7.7	74	4.4	43	3.4
White pine	79	2.6	70	0.2	100	0.6
Lambkill	79	1.7	96	8.3	100	11.9
Black spruce	68	6.3	78	7.3	100	2.7
Wild raisin	63	0.4	74	1.2	57	0.2
Velvet-leaf blueberry	58	5.1	74	5.1	86	14.0
Serviceberry	58	0.3	43	0.6	29	0.1
Red oak	53	1.8	9	0.1	100	3.1
Lowbush blueberry	47	3.9	39	2.7	57	4.3
False holly	42	0.1	61	1.3	57	0.3
Huckleberry	37	2.9	17	10.0	100	34.0
Red spruce	21	0.8	9	0.2		
Witch-hazel	16	0.2	13	0.1	86	4.3
Bayberry	5	9.0			29	0.1
Grey birch	5	0.2	22	0.9		
White birch	5	0.1	22	0.4	14	0.1
Shrub Layer (Mean % Cover)		**26**		**26**		**74**
Bracken	95	10.8	96	12.3	100	13.4
Starflower	84	0.6	61	0.2	86	1.4
Bunchberry	79	4.6	74	4.6	71	8.0
Wild lily-of-the-valley	79	3.2	52	0.3	57	0.1
Sarsaparilla	63	2.0	30	0.2	86	1.3
Teaberry	58	8.0	35	0.1	86	1.3
Mayflower	53	0.5	65	0.3	86	0.8
Pink lady's slipper	53	0.1	57	0.1	71	0.1
Twinflower	47	2.7	17	0.2	14	0.1
Partridge berry	47	1.9	26	0.1	29	0.1
Indian pipe	47	0.1	13	0.1	57	0.1
Bluebead lily	42	0.7	26	0.8		
Goldthread	26	0.2	26	5.3		
Indian cucumber root	26	0.1	4	0.1	29	0.1
Painted trillium	26	0.1	26	0.1	29	0.1
Interrupted fern	21	0.2	4	0.2		
Herb Layer (Mean % Cover)		**30**		**18**		**24**
Schreber's moss	100	21.1	100	67.7	86	8.4
Bazzania	63	2.3	43	1.4	71	1.0
Broom moss	63	1.0	39	1.4	43	1.2
Wavy dicranum	58	1.1	96	6.6	43	1.1
Hypnum moss	53	1.1	30	1.5	71	2.0
Stair-step moss	32	4.2	74	9.7	29	4.0
Hair-cap moss	32	1.9	17	0.1		
Pin cushion moss	26	0.1	9	0.1	43	0.1
Grey reindeer lichen	16	0.1	39	3.2	29	0.6
Ladies' tresses	11	0.2	48	2.3	14	0.1
Bryo-Lichen Layer (Mean % Cover)		**27**		**86**		**12**

Distinguishing Features

This is a softwood forest dominated by white pine with lesser amounts of black spruce and red maple. Variant SP4a has dominant black spruce. Variant SP4b exhibits high cover to huckleberry in the understory. Lambkill and blueberry are common.

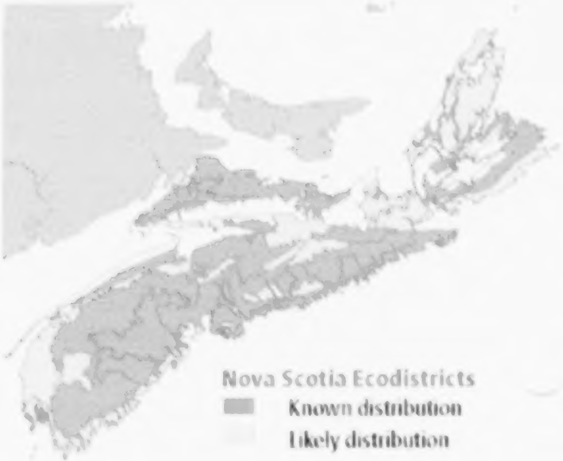
Pink lady's slipper (Reg Newell)

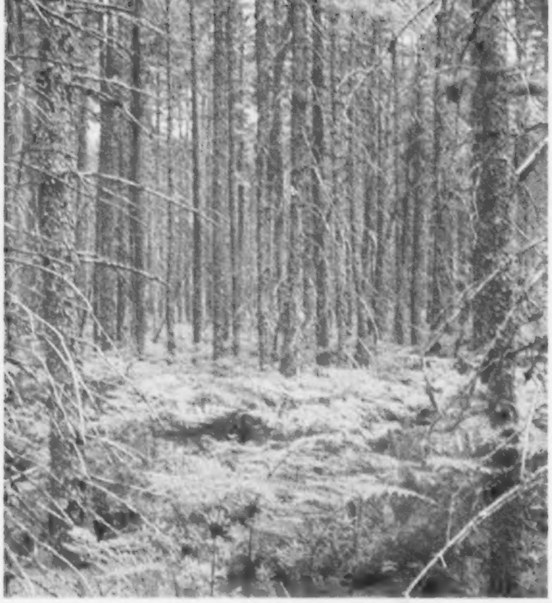
Site Characteristics

Slope Position: Level^{3} Middle^{3} Upper^{3} Other^{1}
Surface Stoniness: (Non - Slightly)^{6} (Very - Excessively)^{3} (Moderately)^{1}
Bedrock Outcrop: (Non-rocky)^{8} (Slightly - Moderately)^{2}
Elevation Range: 13 - 207m
Slope Gradient: Gentle^{6} Level^{3} Other^{1}
Aspect: North^{3} East^{1} South^{2} West^{1} None^{3}
Exposure: Moderate^{9} Other^{1}
Microtopography: Slightly^{5} Level^{2} Moderately^{2} Strongly^{1}
Drainage: Well^{5} Moderately well^{2} Imperfect^{1} Other^{2}

Soil Characteristics

Soil Type: ST2^{3} ST1^{2} ST3^{2} ST2-L^{1} ST15-L^{1} ST6^{1}
Parent Material: Glacial till^{9} Glaciofluvial^{1}
Rooting Depth (cm): (<30)^{2} (30-45)^{3} (>45)^{4} nd^{1}
Duff Thickness (cm): (0-5)^{1} (6-10)^{6} (11-20)^{3}





Jersey,
Cumberland County

SP5

Black spruce / Lambkill / Bracken

Picea mariana / Kalmia angustifolium / Pteridium aquilinum

n=11

Concept: This early to late successional Vegetation Type (VT) has a coniferous tree canopy dominated by black spruce and a well-developed woody shrub layer. Black spruce / Lambkill / Bracken usually follows stand replacing disturbance such as fire, windthrow or harvesting.

Vegetation: Black spruce is the dominant overstory tree with lesser balsam fir. Hybrid (red/black) spruce may also form a significant portion of the canopy. Red maple, white birch, white pine and tamarack are scattered throughout some stands. The shrub layer is dominated by balsam fir and black spruce with lesser red maple. Other characteristic species include wild raisin, lambkill, velvet-leaf blueberry and false holly. Herb and bryophyte diversity is generally low, with bracken the most common herb and smaller amounts of pink lady's slipper, cow wheat and teaberry. Schreber's moss, wavy dicranum and stair-step moss usually dominate the bryophyte layer. The presence of creeping snowberry, cinnamon fern, stair-step moss and patches of sphagnum moss indicate elevated moisture levels.

Environmental Setting: SP5 is associated with fresh to moist, nutrient poor soils. Thick, ericaceous duff layers are common which limit regeneration by seed unless disturbance creates more exposed micro-sites. Without disturbance, black spruce regeneration is usually by vegetative layering. This VT can be found throughout Nova Scotia on a variety of soils with low nutrient status. This VT is widespread and common across the Maritime Provinces.

Successional Dynamics: Nutrient poor soils associated with this VT lead to an edaphic climax community dominated by black spruce. Historically SP5 stands originated from fire disturbance creating mainly even-aged stands. With less frequent disturbance events, white pine may become more prominent in the overstory, possibly leading to a SP4 (White pine / Blueberry / Bracken) community. White pine may also develop a super canopy overtopping an even-aged forest condition of black spruce. SP5 is the successional endpoint for many VTs in the SP group.

Ecological Features

The canopy of this large patch and sometimes matrix forest can be closed or open depending on past disturbances and site conditions. Excessive surface stoniness is common for this vegetation type, limiting the extent of canopy development. Black spruce has intermediate shade tolerance and does not seed well under closed canopies. Vegetative regeneration by layering is common in black spruce, especially on sites where there is a thick duff layer and adequate soil moisture. The accumulation of spruce and pine needles on the ground results in a poorly-developed humus layer and impoverished soil fauna. Spruce grouse eat conifer needles in winter and may be found in this habitat. Dwarf mistletoe sometimes creates dense witches brooms that are important nest and rest areas for small mammals. Mature forests develop abundant old man's beard, a lichen, sought for nest material by northern parula warblers and other species, and for winter food by deer foraging on fallen trees.

Characteristic Plants	SP5 Freq. (%)	SP5 Cover (%)
Black spruce	100	51.1
White pine	55	1.0
Balsam fir	36	16.5
White birch	36	3.3
Red spruce	27	3.3
Red maple	18	6.0
Tamarack	18	0.1
Tree Layer (Mean % Cover)		**62**
Lambkill	91	12.2
Black spruce	82	10.8
Wild raisin	64	0.3
Red maple	64	0.2
Balsam fir	55	3.0
Lowbush blueberry	55	1.9
Velvet-leaf blueberry	55	1.4
False holly	36	0.5
White birch	27	0.1
Shrub Layer (Mean % Cover)		**26**
Bunchberry	82	0.9
Bracken	73	12.8
Teaberry	55	0.6
Mayflower	45	0.1
Painted trillium	36	0.1
Wild lily-of-the-valley	36	0.1
Cow-wheat	27	0.1
Herb Layer (Mean % Cover)		**11**
Schreber's moss	100	74.0
Wavy dicranum	91	2.8
Grey reindeer lichen	73	1.2
Broom moss	64	3.6
Bazzania	55	4.3
Stair-step moss	45	11.0
Hypnum moss	45	3.8
Plume moss	45	2.8
Ladies' tresses	36	0.8
Bryo-Lichen Layer (Mean % Cover)		**92**

Distinguishing Features

This softwood forest of black spruce is found on poor, dry to fresh-moist soils. Most shrubs and herbs represent these site conditions, but in moist depressions small patches of sphagnum, creeping snowberry and cinnamon fern are present.

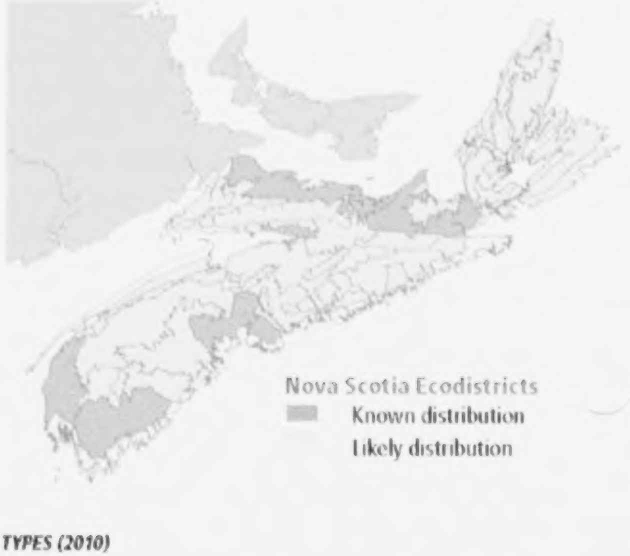
Lambkill

Site Characteristics

Slope Position:	Level^4 Upper^4 Crest^1 Middle^1
Surface Stoniness:	(Non - Slightly)^7 (Moderately)^2 (Very - Excessively)^1
Bedrock Outcrop:	(Non-rocky)^7 (Very - Excessively)^2 (Slightly - Moderately)^1
Elevation Range:	20 - 232m
Slope Gradient:	Level^4 Gentle^4 Moderate^1 nd^1
Aspect:	North^2 East^1 South^1 West^1 None^5
Exposure:	Moderate^7 Mod. exposed^2 Exposed^1
Microtopography:	Level^5 Slightly^3 Moderately^2
Drainage:	Moderately well^3 Rapid^3 Well^3 Imperfect^1

Soil Characteristics

Soil Type:	ST1^3 ST2^3 ST15^2 ST2-L^1 ST16^1
Parent Material:	Glacial till^6 Glaciofluvial^3 Till/Bedrock^1
Rooting Depth (cm):	(<30)^2 (30-45)^4 (>45)^3 nd^1
Duff Thickness (cm):	(0-5)^1 (6-10)^2 (11-20)^5 (21-40)^1 nd^1



Nova Scotia Ecodistricts

- ▨ Known distribution
- ☐ Likely distribution

Thomson Station,
Cumberland County

SP6

Black spruce – Red maple / Bracken – Sarsaparilla

Picea mariana – Acer rubrum /
Pteridium aquilinum – Aralia nudicaulis

n=7

Concept: This early to mid-successional Vegetation Type (VT) supports a mixedwood canopy and a relatively broad suite of herbaceous plants compared to other black spruce dominated VTs. Black spruce – Red maple / Bracken – Sarsaparilla usually follows stand-replacing disturbance events such as fire, windthrow or harvesting.

Vegetation: Black spruce is the dominant overstory tree, but red maple (with its greater potential for crown expansion) also occupies a large proportion of the canopy. White birch, balsam fir, hybrid (red/black) spruce, trembling aspen and white pine can also be found in this VT. Regenerating black spruce and balsam fir dominate the shrub layer along with wild raisin, lambkill, velvet-leaf blueberry and false holly. Bracken and bunchberry are the main species in the herb layer, but a variety of other plants can also be found including sarsaparilla, teaberry and starflower. Bryophyte coverage is generally low with leaf litter dominating the forest floor.

Environmental Setting: SP6 is associated with fresh to moist, nutrient poor soils. This VT can be found throughout Nova Scotia on a variety of soils with low nutrient status. This VT is widespread and common across the Maritime provinces.

Successional Dynamics: Nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and successional patterns. This generally even aged VT usually follows stand-replacing disturbances, with harvesting the most common cause. In the absence of similar disturbance events, SP6 may succeed to a more softwood dominant stand with SP4a (White pine / Blueberry / Bracken variant Black spruce) and SP5 (Black spruce / Lambkill / Bracken) possible outcomes. SP5 is the edaphic climax for this successional pathway.

Ecological Features

This forest occurs as small to large patches in many parts of the province. It can exhibit closed or open canopies, depending on past disturbances and the degree of surface stoniness, which is often excessive in this ecosystem. Black spruce has intermediate shade tolerance and does not seed well under closed canopies; however vegetative regeneration by layering is common especially where there is a thick duff layer and adequate moisture. Dwarf mistletoe sometimes creates dense witches brooms, providing important nest and rest areas for small mammals. Mature forests develop abundant old man's beard, a lichen sought for nest material by northern parula warblers and other species, and for winter food by deer foraging on fallen trees.

Characteristic Plants	SP6 Freq. (%)	SP6 Cover (%)
Black spruce	100	34.0
Red maple	100	19.7
White birch	86	3.7
White pine	57	6.8
Balsam fir	43	8.7
Large tooth aspen	29	6.0
Grey birch	14	15.0
Red oak	14	8.0
Jack pine	14	5.0
Red pine	14	3.0
Red spruce	14	3.0
White spruce	14	0.1
Tree Layer (Mean % Cover)		**71**
Black spruce	100	7.9
Balsam fir	86	14.9
Lambkill	86	11.3
Red maple	86	2.0
Wild raisin	86	0.5
Velvet-leaf blueberry	71	2.5
Red oak	71	0.1
Lowbush blueberry	57	6.4
White pine	43	0.7
False holly	43	0.2
Serviceberry	43	0.1
Striped maple	29	0.4
Willows	29	0.1
Shrub Layer (Mean % Cover)		**46**
Bunchberry	100	5.2
Starflower	100	0.3
Bracken	86	6.2
Wild lily-of-the-valley	71	1.0
Pink lady's slipper	71	0.1
Teaberry	57	4.6
Sarsaparilla	57	1.1
Goldthread	43	0.5
Bluebead lily	43	0.1
Ground pine	43	0.1
Mayflower	43	0.1
Partridge-berry	43	0.1
Twinflower	43	0.1
Interrupted fern	29	1.8
Bristly club-moss	29	0.1
Indian cucumber root	29	0.1
New York fern	29	0.1
Herb Layer (Mean % Cover)		**16**
Schreber's moss	100	10.2
Hypnum moss	71	5.5
Bazzania	71	5.1
Wavy dicranum	71	2.5
Broom moss	71	1.0
Hair-cap moss	71	1.0
Ladies' tresses	43	9.0
Stair-step moss	43	5.5
Grey reindeer lichen	43	0.1
Bryo-Lichen Layer (Mean % Cover)		**28**

Distinguishing Features

A mixedwood forest usually dominated by black spruce with a significant component of red maple and scattered other species. The shrub and herb layer is indicative of poor and dry to fresh conditions represented by lambkill and bracken. Moss cover is reduced as red maple cover increases.

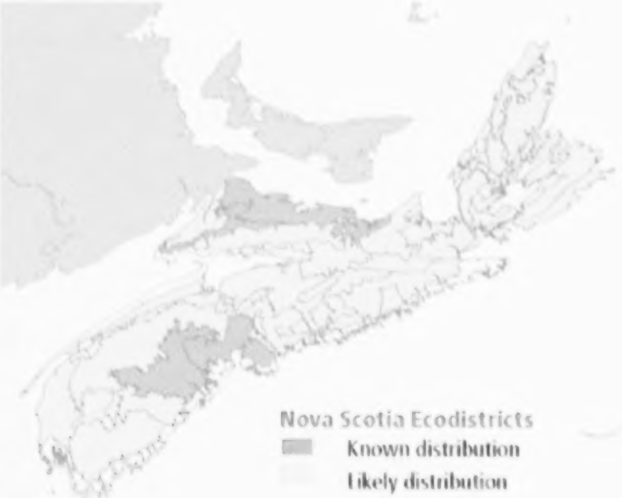
Black spruce cones

Site Characteristics

Slope Position:	Upper^{4} Lower^{3} Middle^{3}
Surface Stoniness:	(Non - Slightly)^{4} (Very - Excessively)^{4} (Moderately)^{2}
Bedrock Outcrop:	(Non-rocky)^{7} (Slightly - Moderately)^{3}
Elevation Range:	46 - 187m
Slope Gradient:	Gentle^{6} Moderate^{3} nd^{1}
Aspect:	North^{4} East^{2} West^{4}
Exposure:	Moderate^{10}
Microtopography:	Moderately^{6} Slightly^{3} Level^{1}
Drainage:	Well^{8} Imperfect^{1} Moderately well^{1}

Soil Characteristics

Soil Type:	ST2^{8} ST3-G^{1} ST16^{1}
Parent Material:	Glacial till^{8} Till/Bedrock^{1} nd^{1}
Rooting Depth (cm):	(<30)^{3} (30-45)^{2} (>45)^{4} nd^{1}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{5} (11-20)^{3} nd^{1}



Black Lake,
Cumberland County

SP7

Black spruce / False holly / Ladies' tresses sphagnum

Picea mariana / Nemopanthus mucronata / Sphagnum capillifolium

n=39

Concept: This edaphic Vegetation Type (VT) has abundant black spruce and a well-developed woody shrub layer. Trees often have a hybridized appearance with traits of both black and red spruce expressed. Black spruce / False holly / Ladies' tresses occupies moister site conditions between drier upland spruce-pine types (SP1, SP2, SP3, SP4, SP5) and wet black spruce types (WC1, WC2, WC3, WC4).

Vegetation: Black spruce is the dominant overstory tree along with tamarack, red maple and balsam fir. Hybrid (red/black) spruce occurs on sites with slightly higher fertility. The shrub layer is occupied by ericaceous species such as lambkill, velvet leaf blueberry and lowbush blueberry, along with false holly and wild raisin. A variety of herb species are possible, but the dominant plants are bunchberry, bracken and goldthread. Scattered sedges, creeping snowberry and cinnamon fern indicate the presence of increased moisture; while bracken, lady slipper and mayflower indicate low nutrient status. Bryophyte cover is dominated by Schreber's moss, wavy dicranum and stair step moss. Pockets of sphagnum moss indicate elevated moisture levels.

Environmental Setting: SP7 is found throughout Nova Scotia on a variety of moist, nutrient poor soil types. Thick, ericaceous duff layers are common, limiting tree regeneration by seed unless disturbance creates more exposed micro-sites. Without disturbance, black spruce regeneration is usually by vegetative layering. Sites supporting this VT tend to have minimal mounding due to the shallow rooted nature of the overstory spruce. This VT is widespread and common across the Maritime Provinces.

Successional Dynamics: Moist, nutrient poor soils associated with this VT lead to an edaphic climax community dominated by black spruce. This generally even-aged VT follows stand-replacing disturbances such as fire, windthrow and harvesting. Due to its unique ecological setting, this VT does not shift to other vegetation types after disturbance, but does change in development stage. Under less frequent disturbance events, natural senescence can create some unevenness in both age class and stand structure.

Ecological Features

This forest occurs as large-patch and sometimes matrix in many parts of the province. It can exhibit closed or open canopies, depending on past disturbances and the degree of surface stoniness, which is often excessive in this ecosystem. Black spruce has intermediate shade tolerance and does not seed well under closed canopies. Vegetative regeneration by layering is common especially where there is a thick duff layer. Spruce grouse eat conifer needles in winter and may be found in this habitat. This forest may provide habitat for wetland associated species such as olive-sided flycatchers, mourning warblers, star-nosed moles and four-toed salamanders. Dwarf mistletoe sometimes creates dense witches brooms that may provide nest and rest areas for small mammals. Mature forests develop abundant old man's beard, lichen that provides important nest and forage material for some species.

Characteristic Plants	SP7 Freq. (%)	 Cover (%)
Black spruce	95	51.6
Balsam fir	56	10.9
Red maple	41	2.3
Tamarack	36	6.6
White pine	23	1.2
White spruce	10	7.0
Tree Layer (Mean % Cover)		**66**
Lambkill	90	7.5
Balsam fir	90	5.2
Black spruce	77	9.0
False holly	77	1.6
Velvet-leaf blueberry	74	4.3
Wild raisin	74	0.7
Red maple	74	0.5
Lowbush blueberry	41	0.9
Serviceberry	26	0.1
Shrub Layer (Mean % Cover)		**25**
Bunchberry	90	8.7
Bracken	69	11.4
Goldthread	67	1.2
Wild lily of the valley	64	0.5
Cinnamon fern	49	1.5
Creeping snowberry	44	2.4
Starflower	44	0.2
Mayflower	36	0.3
Twinflower	33	2.2
Pink lady's slipper	26	0.1
Teaberry	23	0.2
Bluebead lily	21	0.8
Three seeded sedge	21	0.7
Herb Layer (Mean % Cover)		**21**
Schreber's moss	100	63.6
Wavy dicranum	92	4.2
Stair-step moss	79	17.2
Ladies' tresses	79	4.3
Bazzania	62	6.6
Broom moss	51	4.1
Grey reindeer lichen	49	2.4
Cup lichens	41	0.4
Hair cap moss	36	0.3
Common green sphagnum	33	0.1
Plume moss	28	1.0
Hypnum moss	26	6.8
Bryo-Lichen Layer (Mean % Cover)		**95**

Distinguishing Features

This softwood forest of black spruce occurs on imperfectly drained soils. Species indicative of moist soils should be present, especially sphagnum in the depressions, cinnamon fern and/or creeping snowberry. False holly and sedges are common.

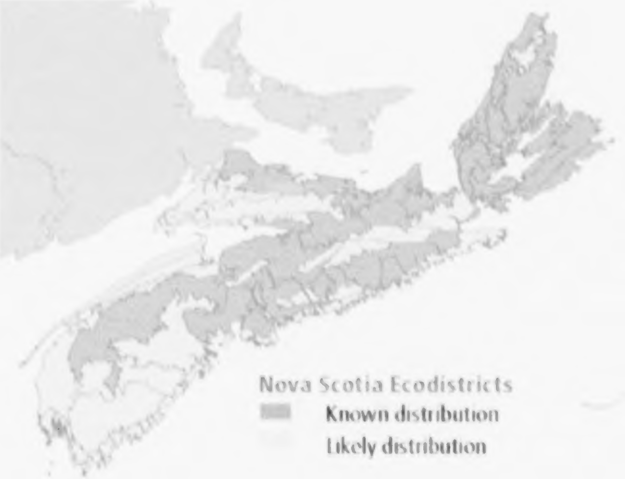
Imperfectly drained soil

Site Characteristics

Slope Position:	Level^{6} Middle^{2} Lower^{1} Upper^{1}
Surface Stoniness:	(Non - Slightly)^{8} (Very - Excessively)^{1} (Moderately)^{1}
Bedrock Outcrop:	(Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	12 - 407m
Slope Gradient:	Level^{7} Gentle^{3}
Aspect:	North^{1} East^{2} South^{1} None^{6}
Exposure:	Moderate^{8} Mod. exposed^{1} Exposed^{1}
Microtopography:	Slightly^{4} Level^{3} Moderately^{2} Strongly^{1}
Drainage:	Imperfect^{9} Poor^{1}

Soil Characteristics

Soil Type:	ST6^{7} ST3^{1} ST16^{1} Other^{1}
Parent Material:	Glacial till^{8} Till/Bedrock^{1} Glaciofluvial^{1}
Rooting Depth (cm):	(<30)^{8} (30-45)^{1} (>45)^{1}
Duff Thickness (cm):	(6-10)^{3} (11-20)^{5} (21+)^{1} nd^{1}



Mount William,
Pictou County

SP8

Black spruce – Aspen / Bracken – Sarsaparilla

Picea mariana – Populus tremuloides – Populus grandidentata / Pteridium aquilinum – Aralia nudicaulis

n=6

Concept: This early successional Vegetation Type (VT) supports a mixedwood canopy of black spruce and pioneer hardwoods including large-tooth aspen and trembling aspen. Residual trees having survived past disturbances are often present, including large over-topping white pine and red oak. These residuals have important ecological value, but their presence has minimal significance in classifying this VT. Black spruce – Aspen / Bracken – Sarsaparilla usually follows stand-replacing disturbance events such as fire, windthrow or harvesting.

Vegetation: Black spruce, large-tooth aspen and trembling aspen are the dominant overstory trees, along with white and grey birch, red maple and red oak. The shrub layer is dominated by lambkill, velvet-leaf blueberry and wild raisin. Black spruce, white pine, balsam fir and red maple regeneration can also be extensive. The herb layer consists primarily of sarsaparilla, bracken, bunchberry and wild lily of the valley. Schreber's moss and wavy dicranum are the dominant bryophytes.

Environmental Setting: SP8 is associated with dry to fresh-moist, nutrient poor soils. This VT is commonly found in the Northumberland Bras d'Or ecoregion but can be found throughout Nova Scotia on a variety of soils with low nutrient status. This VT is widespread and common across the Maritime Provinces, although large-tooth aspen is found less frequently outside Nova Scotia and southern New Brunswick.

Successional Dynamics: Nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and successional patterns. SP8 is primarily an even-aged, early successional VT that follows stand level disturbances such fire, windthrow or harvesting. Possible successional stages include SP4a (White pine / Blueberry / Bracken variant Black spruce), SP5 (Black spruce / Lambkill / Bracken), SP6 (Black spruce – Red maple / Bracken – Sarsaparilla) and SP9 (Red oak – White pine / Teaberry).

Ecological Features

This closed or open forest forms large patch ecosystems following stand-level disturbances in many parts of the province. It provides several ecological functions including nutrient cycling, rapid site regeneration, and nurse crop protection for later successional species such as white pine and red spruce. Excessive surface stoniness is common, limiting the extent of canopy development. Black spruce has intermediate shade tolerance and does not seed well under closed canopies. Vegetative regeneration by layering is common in black spruce, producing small clonal groups. However aspen regenerates profusely from root suckers when disturbed, producing extensive clonal colonies which may also support large fungal associates such as shoe-string root rot (honey mushroom). Aspen is an important tree for cavity nesting birds, and its buds provide winter food for ruffed grouse. Other bird species that may be found in this habitat are vireos, ovenbirds and veery.

Characteristic Plants

Characteristic Plants	SP8	
	Freq. (%)	Cover (%)
Black spruce	100	27.8
Red maple	83	8.2
Balsam fir	83	6.0
Large-tooth aspen	67	29.5
Trembling aspen	33	13.0
Red oak	33	6.5
Hemlock	33	0.1
White pine	17	20.0
White spruce	17	20.0
Red spruce	17	8.0
Grey birch	17	3.0
Tamarack	17	0.1
White birch	17	0.1
Tree Layer (Mean % Cover)		**74**
Balsam fir	100	8.8
Lambkill	83	10.9
Velvet-leaf blueberry	83	4.2
Black spruce	83	1.8
Wild raisin	83	0.9
Red maple	83	0.7
White pine	67	3.2
Fly honeysuckle	50	0.1
Large-tooth aspen	50	0.1
Serviceberry	50	0.1
Lowbush blueberry	33	1.3
Red oak	33	0.6
Striped maple	33	0.2
False holly	33	0.1
Trembling aspen	33	0.1
White birch	33	0.1
Shrub Layer (Mean % Cover)		**28**
Wild lily of the valley	100	6.4
Sarsaparilla	100	1.5
Bracken	83	8.1
Twinflower	83	1.5
Starflower	83	1.1
Bunchberry	67	3.1
Partridge-berry	67	1.4
Teaberry	50	5.8
Interrupted fern	50	3.2
Bluebead lily	50	0.3
Wood aster	50	0.2
Cow-wheat	33	0.1
Goldthread	33	0.1
Ground pine	33	0.1
Indian cucumber root	33	0.1
Rice grass	33	0.1
Herb Layer (Mean % Cover)		**25**
Schreber's moss	100	4.9
Wavy dicranum	83	1.4
Bazzania	83	0.3
Broom moss	67	0.2
Stair-step moss	50	0.7
Hypnum moss	50	0.2
Common green sphagnum	33	0.8
Shaggy moss	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**8**

Distinguishing Features

A mixedwood forest of black spruce on well drained nutrient poor soils, with either large-tooth or trembling aspen as the dominant hardwood species. Sarsaparilla, bracken and bunchberry give a leafy appearance to the understory. Lambkill and blueberry are extensive.

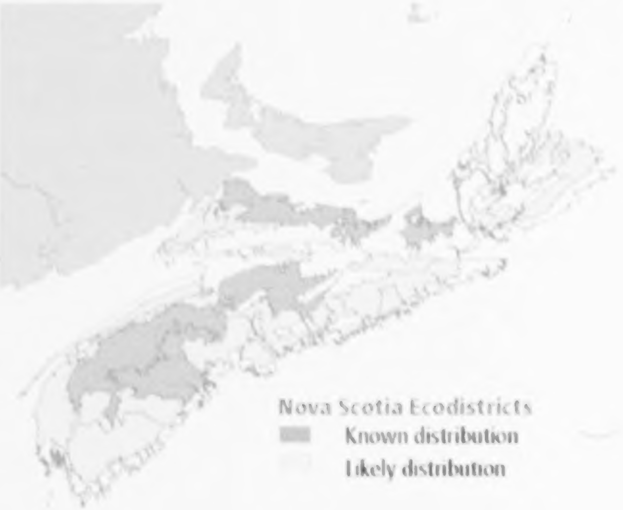
Round-leaved pyrola

Site Characteristics

Slope Position:	Level^{3} Middle^{3} Lower^{2} Upper^{2}
Surface Stoniness:	(Non - Slightly)^{8} (Moderately)^{2}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	33 - 153m
Slope Gradient:	Gentle^{8} Level^{2}
Aspect:	North^{5} South^{2} West^{1}
Exposure:	Moderate^{8} Mod. sheltered^{1} Mod. exposed^{1}
Microtopography:	Moderately^{5} Strongly^{3} Level^{2}
Drainage:	Imperfect^{5} Well^{3} Moderately well^{2}

Soil Characteristics

Soil Type:	ST2^{5} ST6^{5}
Parent Material:	Glacial till^{10}
Rooting Depth (cm):	(<30)^{2} (30-45)^{3} (>45)^{5}
Duff Thickness (cm):	(0-5)^{3} (6-10)^{5} (11-20)^{2}



Round Lake,
Queens County

SP9

Red oak – White pine / Teaberry

Quercus rubra – Pinus strobus / Gaultheria procumbens

n=11

Concept: This early to late successional mixedwood Vegetation Type (VT) has abundant white pine and red oak, a significant component of shade intolerant hardwoods and a well-developed woody shrub layer. Red oak – White pine / Teaberry usually follows stand-replacing disturbances such as fire, windthrow or harvesting.

Vegetation: White pine and red oak are the dominant overstory trees along with red maple, white birch and both aspen species. White pine may also occur in a super canopy position – residual survivors from past disturbance events. The shrub layer is primarily ericaceous species such as velvet leaf blueberry, lowbush blueberry and lambkill along with regenerating white pine, red oak, black spruce and red maple. Other woody shrubs may include serviceberry, witch-hazel and wild raisin. The herb layer includes many species associated with dry, poor sites such as teaberry, bracken, mayflower, cow wheat, princes' pine, poverty grass and round-leaved pyrola. The bryophyte layer is poorly developed.

Environmental Setting: SP9 is mainly associated with dry to fresh, nutrient poor soils derived from granitic glacial till. Most sites also have moderate to extreme surface stoniness. This VT is abundant throughout the Western ecoregion, especially in the South Mountain, Western Barrens, Rossignol and Sable ecodistricts. This VT is uncommon in New Brunswick and absent from Prince Edward Island.

Successional Dynamics: This VT is strongly shaped by past disturbances and the relatively dry, nutrient poor soils where it occurs. Historically, stand maintaining fires would have reduced understory fuel loads and promoted white pine and red oak dominance until the overstory was destroyed by an intense canopy fire. (Although the role of low intensity fires in red oak development is not well understood, it appears to have merit). Successional VTs associated with SP9 include IH1 (Large-tooth aspen / Lambkill / Bracken), IH2 (Red oak – Red maple / Witch-hazel) and SP4a (White pine / Blueberry / Bracken variant Black spruce).

Ecological Features

This closed canopy, small- to large-patch forest occurs on sites underlain by dry, nutrient poor, coarse soils derived from granites and quartzites. The longevity of the dominant tree species supports development opportunities for old growth forests, depending on the interval between stand initiating disturbances. Red oak is a valuable mast tree for wildlife species including squirrels, bear, ruffed grouse and deer. This tree has intermediate shade tolerance and will occur in both the understory and overstory. Regeneration of red oak is difficult; however young trees sprout vigorously following understory fire, providing a competitive advantage where this gap disturbance occurs. Oak is the preferred host of maitake, or hen-of-the-woods, a prized edible mushroom.

Characteristic Plants

	SP9	
	Freq. (%)	Cover (%)
White pine	100	24.3
Red oak	100	24.0
Red maple	90	7.9
White birch	70	6.6
Large tooth aspen	40	12.0
Black spruce	40	4.3
Beech	20	24.5
Balsam fir	20	6.0
Trembling aspen	10	5.0
Hemlock	10	4.0
White spruce	10	4.0
Hybrid spruce	10	2.0
Tamarack	10	2.0
Tree Layer (Mean % Cover)		**74**
Red oak	90	6.0
Velvet leaf blueberry	80	13.6
Red maple	80	2.5
White pine	80	1.5
Lambkill	70	6.0
Black spruce	70	4.9
Wild raisin	70	0.8
Balsam fir	60	5.2
Witch hazel	50	3.6
Serviceberry	50	0.1
Lowbush blueberry	40	5.0
Beech	40	4.3
Huckleberry	30	2.8
Large tooth aspen	30	0.5
Striped maple	30	0.1
Shrub Layer (Mean % Cover)		**39**
Teaberry	90	4.3
Bracken	80	8.2
Bunchberry	80	4.8
Wild lily of the valley	80	1.2
Mayflower	80	1.1
Starflower	80	0.1
Sarsaparilla	70	1.8
Partridge berry	70	1.7
Pink lady's slipper	50	0.3
Indian cucumber root	40	0.1
Indian pipe	40	0.1
Rice grass	30	0.3
Round leaved pyrola	30	0.2
Wood aster	30	0.2
Cow-wheat	30	0.1
Painted trillium	30	0.1
Princes' pine	30	0.1
Rock polypody	30	0.1
Herb Layer (Mean % Cover)		**20**
Hypnum moss	90	7.5
Broom moss	90	1.3
Schreber's moss	80	2.0
Grey reindeer lichen	40	0.8
Wavy dicranum	40	0.6
Stair step moss	40	0.5
Cup lichens	40	0.1
Bazzania	30	3.8
Pin cushion moss	30	0.3
Bryo-Lichen Layer (Mean % Cover)		**12**

Distinguishing Features

White pine and red oak are diagnostic of this hardwood-dominated mixedwood. Red maple, white birch and/or aspen are a significant component. The shrub and herb layer is indicative of poor and dry to fresh conditions. Round-leaved pyrola, princes' pine, mayflower and teaberry are all good indicator species for this vegetation type.

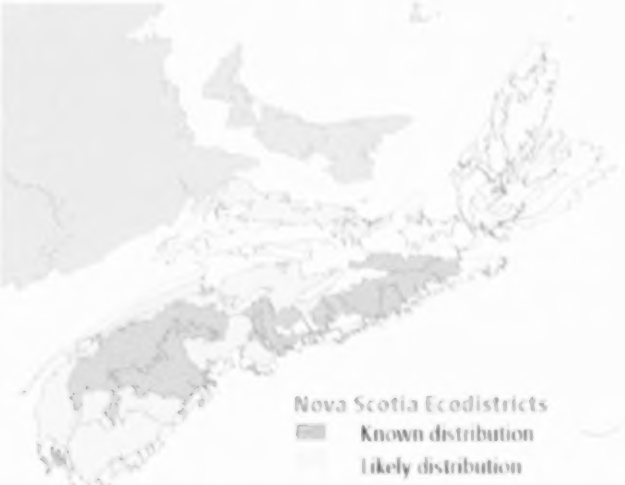
Princes'-pine

Site Characteristics

Slope Position:	Upper[6] Middle[3] Crest[1]
Surface Stoniness:	(Moderately)[8] (Very - Excessively)[1] (Non - Slightly)[1]
Bedrock Outcrop:	(Non-rocky)[9] (Slightly - Moderately)[1]
Elevation Range:	61 - 201m
Slope Gradient:	Gentle[3] Steep[2] Level[1] Moderate[3] nd[1]
Aspect:	North[2] East[2] South[2] West[3] None[1]
Exposure:	Moderate[9] Mod. exposed[1]
Microtopography:	Level[4] Slightly[4] Moderately[2]
Drainage:	Well[9] Rapid[1]

Soil Characteristics

Soil Type:	ST2[8] ST2-G[1] ST5[1]
Parent Material:	Glacial till[9] Till/Bedrock[1]
Rooting Depth (cm):	(30-45)[5] (>45)[4] nd[1]
Duff Thickness (cm):	(0-5)[5] (6-10)[3] (11-20)[1] nd[1]



Stubbart Road, Margaree,
Inverness County

SP10

Tamarack / Wild raisin / Schreber's moss

Larix laricina / Viburnum nudum /
Pleurozium schreberi

n=3

Concept: This early successional Vegetation Type (VT) has an overstory dominated by tamarack along with scattered white spruce. The susceptibility of tamarack to several defoliating insects reduces the likelihood this VT will attain advanced maturity. Tamarack / Wild raisin / Schreber's moss usually follows stand-replacing disturbances such as fire, windthrow or harvesting.

Vegetation: Tamarack is the dominant overstory tree. The shrub layer consists mainly of wild raisin and regenerating black spruce. Typical woodland flora are found in the herb layer, along with species associated with past harvesting (e.g. asters, goldenrods, grasses and sedges). The bryophyte layer includes Schreber's moss, hair-cap moss, plume moss and broom moss. Moss coverage is often interspersed with needle carpet.

Environmental Setting: SP10 is associated with fresh to moist, nutrient poor to medium soils. This VT has only been found in the Inverness Lowlands and Bras d'Or Lowlands ecodistricts.

Successional Dynamics: Nutrient poor soils associated with this VT lead to an edaphic climax community dominated by black spruce. This even-aged VT follows stand-replacing disturbances, with harvesting the most common cause. As the tamarack succumbs to insect defoliation or senescence, SP10 will generally succeed to SP6 (Black spruce – Red maple / Bracken / Sarsaparilla) or directly to SP5 (Black spruce / Lambkill / Bracken), the edaphic climax for this successional pathway.

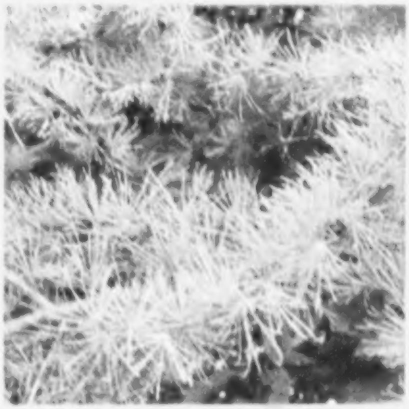
Ecological Features

This early successional ecosystem is a closed-canopy small patch forest occurring in eastern Nova Scotia. Tamarack has a dense, strong wood, with high decay resistance, which contributes to the development of substantial coarse woody material, particularly when higher mortality occurs after insect predation, disease, or blowdown and breakage in wind storms. Tamarack is very intolerant of shade and will not regenerate under a closed canopy. Tamarack seeds are eaten by purple finches, and red and white-winged crossbills. Small mammals cache fallen cones, while porcupines and snowshoe hare eat tamarack bark. The larch sawfly periodically reaches epidemic levels, defoliating trees over successive years. The larch slippery jack fungus forms a mycorrhizal relationship with larch and often fruits abundantly in the fall.

Characteristic Plants	SP10 Freq. (%)	SP10 Cover (%)
Tamarack	100	46.0
White spruce	100	3.3
White birch	67	4.0
Balsam fir	33	30.0
Black spruce	33	4.0
Tree Layer (Mean % Cover)		**63**
Black spruce	100	4.0
Wild raisin	100	1.0
False holly	67	0.8
Lowbush blueberry	67	0.1
Mountain ash	67	0.1
Red maple	67	0.1
Balsam fir	33	7.0
Lambkill	33	5.0
Tamarack	33	3.0
White spruce	33	1.0
Pin cherry	33	0.1
Red berried elder	33	0.1
Shrub Layer (Mean % Cover)		**11**
Starflower	100	0.1
Wild lily of the valley	67	1.6
Goldthread	67	1.0
Evergreen wood fern	67	0.4
Bunchberry	33	7.0
Common speedwell	33	3.0
Brownish sedge	33	1.0
Three seeded sedge	33	1.0
Bladder sedge	33	0.1
Calico aster	33	0.1
Cinnamon fern	33	0.1
Common woodrush	33	0.1
Dwarf raspberry	33	0.1
Ground pine	33	0.1
Hair fescue	33	0.1
Hickey's club moss	33	0.1
Ox-eye daisy	33	0.1
Pine-sap	33	0.1
Poverty grass	33	0.1
Rough goldenrod	33	0.1
Shinleaf	33	0.1
Spreading sedge	33	0.1
Tall white aster	33	0.1
Violets	33	0.1
Herb Layer (Mean % Cover)		**7**
Broom moss	100	0.2
Schreber's moss	100	43.3
Hair-cap moss	100	1.3
Plume moss	100	0.5
Stair-step moss	67	16.5
Wavy dicranum	67	2.0
Hypnum moss	33	2.0
Shaggy moss	33	0.5
Bazzania	33	0.1
Common green sphagnum	33	0.1
Dicranums	33	0.1
Pin cushion moss	33	0.1
Fine sphagnum	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**59**

Distinguishing Features

A softwood forest dominated by tamarack on well to imperfectly drained soils and not found on old field sites. Asters, goldenrods, sedges and grasses are common in the understory.



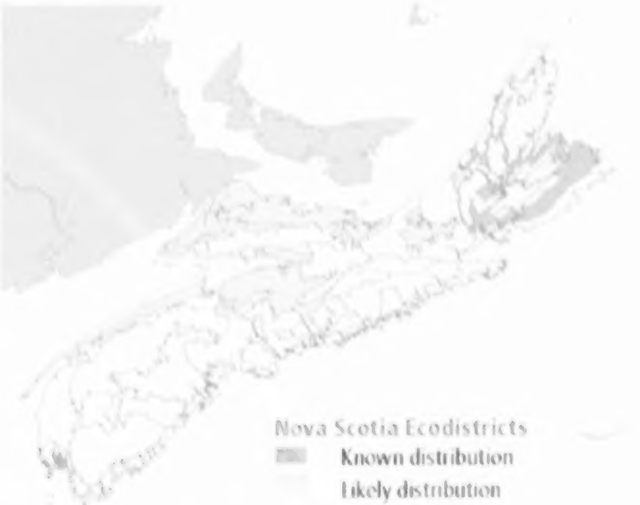
Tamarack

Site Characteristics

Slope Position:	Level^{10}
Surface Stoniness:	(Non - Slightly)^{7} (Very - Excessively)^{3}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	37 - 70m
Slope Gradient:	Level^{10}
Aspect:	East^{3} None^{7}
Exposure:	Moderate^{10}
Microtopography:	Moderately^{10}
Drainage:	Imperfect^{3} Moderately well^{3} Well^{3}

Soil Characteristics

Soil Type:	ST2^{7} ST3^{3}
Parent Material:	Glacial till^{7} Glaciofluvial^{3}
Rooting Depth (cm):	(30-45)^{7} (>45)^{3}
Duff Thickness (cm):	(0-5)^{3} (6-10)^{3} (11-20)^{3}



TH

Tolerant Hardwood Forest Group

(n = 269)

TH1	Sugar maple / Hay-scented fern	**TH1a** Beech variant **TH1b** Yellow birch variant
TH2	Sugar maple / New York fern – Northern beech fern	**TH2a** Yellow birch variant
TH3	Sugar maple – White ash / Christmas fern	
TH4	Sugar maple – White ash / Silvery spleenwort – Baneberry	
TH5	Beech / Sarsaparilla / Leaf litter	
TH6	Red oak – Yellow birch / Striped maple	
TH7	Yellow birch – White birch / Evergreen wood fern	
TH8	Red maple – Yellow birch / Striped maple	**TH8a** White ash variant

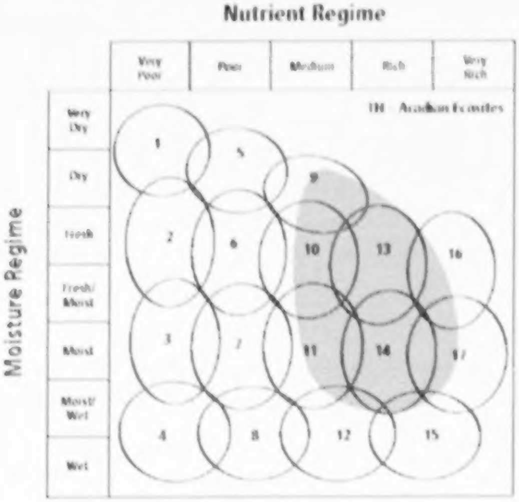
Concept: This group represents mid to late successional tolerant hardwood Vegetation Types (VT) found on zonal sites within the Acadian Ecosite group. Representative species include sugar maple, yellow birch, beech, red maple and white ash. The shrub layer can be extensive, but it is the diversity and abundance of ferns that define the understory in this forest group. Bryophytes, if present, are confined to dead wood and lower boles of overstory trees.

Vegetation: Vegetation types are closed canopy forests dominated by sugar maple, beech, yellow birch and red maple along with white ash, ironwood and (in western Nova Scotia) red oak. Scattered red spruce and white spruce are also common, while balsam fir can be a significant understory species. The shrub layer consists mainly of regenerating trees. Other common shrubs include striped maple, mountain maple, beaked hazelnut, fly-honeysuckle, hobblebush and alternate-leaved dogwood. Many fern species can be found in the herb layer, but typical species include hay-scented fern, New York fern, northern beech fern, evergreen wood fern and Christmas fern.

Environmental Setting: Vegetation types in this group are found on a range of slope positions. Most sites are non-rocky, but surface stoniness can be variable. Soils are mainly derived from glacial till or colluvium deposits. A wide range of moisture levels can be found, but most sites range from fresh to moist. Fertility is generally medium to rich throughout. Various VTs form the matrix forest in the Nova Scotia Uplands (300) ecoregion, slopes of the Cape Breton Highlands (200) ecoregion and in the North Mountain (920) ecodistrict. Some VTs also form small to medium patches in drumlin dominated ecodistricts throughout the province. This group is absent in the Cape Breton Taiga (100) and Atlantic Coastal (800) ecoregions.

Successional Dynamics: This group is associated with mid to late successional zonal VTs. Stand-level disturbance events are rare and many VTs in this group will (or can) maintain themselves through gap replacement leading to uneven-aged climax forests. Two historic, province-wide disturbance events have influenced the current composition of this group. The introduction of beech bark canker *circa* 1900 has reduced the overstory prominence of this species and relegated it to an aggressive component of the lower canopy and shrub layers. Birch dieback in the 1940s decreased the abundance of yellow birch in the overstory and led to an increase in sugar maple coverage in some affected areas.

Edatopic Grid



Ecological Features

Tolerant hardwood forests are characterized by temperate trees and understory flora, high species richness, diverse stand structures and by generally rich and well drained soils. These large patch and matrix forests typically occur over hundreds of hectares and reach the northeastern extent of their range in Nova Scotia. They have a high potential to sustain old growth stands with complex dynamics supporting a wide range of age and size classes. Tolerant hardwood sites provide numerous microhabitats including: vernal pools, seeps, deep leaf litter and surface relief structures. Additional habitat features are embedded in the vegetation. Larger trees may have broken tops, hollow boles, cavities and rough bark; attributes that provide shelter, foraging, perching and/or growing sites. Vertical complexity is particularly important for aerial foragers and nesters, while other wildlife species are associated with patches of shrubs or ferns, conifer inclusions, deadwood, or with particular age classes or species. The typically fertile soils support many rare plants, while nutrient rich tree bark surfaces provide important bryophyte and lichen habitat.

Lake Alma,
Annapolis County

TH1

Sugar maple / Hay-scented fern

Acer saccharum / Dennstaedtia punctilobula

TH1a

Beech variant

Fagus grandifolia

TH1b

Yellow birch variant

Betula alleghaniensis

n=59

Concept: This late successional Vegetation Type (VT) has an overstory dominated by sugar maple and yellow birch, accompanied by a mix of mostly shade-tolerant trees. It is similar to TH2 (Sugar maple / New York fern – Northern beech fern), but is generally associated with drier and/or slightly less fertile sites. There are two variants: TH1a, where beech is abundant in both the overstory and understory; and TH1b, where yellow birch is dominant in the overstory. Due to the long-lived and shade-tolerant nature of dominant overstory trees, this VT will develop old forest characteristics maintained by gap disturbance. TH1 is one of several Acadian hardwood VTs found on zonal sites throughout Nova Scotia.

Vegetation: Sugar maple, yellow birch and beech are the dominant overstory trees (in various combinations) with lesser red maple and scattered red spruce and white spruce. The shrub layer contains regenerating tree species along with striped maple, fly-honeysuckle and mountain maple. Beech and/or striped maple coverage in this layer can sometimes be extensive, strongly out-competing other species. Herb coverage is diverse, but generally dominated by hay-scented fern and evergreen wood fern. Other common species may include rose twisted stalk, Indian cucumber root, wood sorrel, drooping wood sedge and wood aster. Spring ephemerals may include spring-beauty, Dutchman's-breeches and dog tooth violet. The bryophyte layer is poorly developed, with moss cover generally restricted to tree trunks, stones and downed woody material.

Environmental Setting: TH1 is mainly associated with dry to fresh-moist, nutrient medium to rich soils of glacial origin. This VT is found throughout the province in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts, and on the upper slopes of drumlins. However, TH1 is relatively uncommon on the lowland ecodistricts and does not occur in the Atlantic coastal ecoregion. The variant TH1a (Beech) usually occurs on drier sites, while TH1b (Yellow birch) is associated with moister conditions. It is widespread and abundant across New Brunswick but somewhat rare on Prince Edward Island.

Successional Dynamics: TH1 is a late successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood. Excluding harvesting, stand level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind or ice damage. Following stand level disturbance, TH1 can develop from early and mid-successional VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern), IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern), IH7 (Red maple / Hay-scented fern – Wood sorrel), TH7 (Yellow birch – White birch / Evergreen wood fern) and TH8 (Red maple – Yellow birch / Evergreen wood fern). Early successional stages can be by-passed if, at the time of disturbance, advanced sugar maple and yellow birch regeneration is retained.

Ecological Features

This matrix forest typically occurs over hundreds of hectares. The longevity, shade tolerance and deep roots of sugar maple and beech promote stand continuity, high old-growth potential and uneven age structure. Stands on high elevation (greater than 200 m) crests and upper slopes are exposed to strong winds and are susceptible to ice storms, blowdown and crown breakage. Vernal pools, seeps and springs are common and may provide habitat for several amphibians (e.g. wood frogs). This forest may provide habitat for warblers, thrushes, woodpeckers, flying squirrels and fishers. Large trees may provide nest sites for barred owls and northern goshawks. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Hard mast from beech and beaked hazelnut provides a significant food source for bears and other fauna. These forests host a variety of spring ephemeral plants. With increased light availability caused by canopy disturbances, hay-scented fern can be very invasive and spread aggressively, which restricts tree regeneration.

Characteristic Plants	TH1		TH1a		TH1b	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Sugar maple	100	51.0	100	53.0	100	18.2
Yellow birch	83	13.5	60	1.7	100	41.5
Red maple	58	14.9	20	35.0	33	3.5
Beech	50	16.3	100	24.0	33	8.0
Red spruce	27	5.3	40	0.1		
White birch	17	7.4	20	5.0	17	0.1
Balsam fir	17	6.1			33	10.0
White spruce	13	4.2			17	5.0
White ash	10	2.0			33	0.1
Hemlock	2	5.0	20	10.0		
Tree Layer (Mean % Cover)		**82**		**86**		**68**
Sugar maple	88	5.0	80	7.6	100	4.9
Beech	77	11.4	100	16.6	83	19.3
Striped maple	69	3.7	60	1.5	83	2.6
Yellow birch	69	2.8	20	0.3	83	0.4
Balsam fir	60	2.0	80	6.8	83	0.3
Red maple	50	2.3	60	1.6	33	0.8
Fly honeysuckle	50	0.6	40	0.2	50	0.1
Red spruce	42	3.0	40	0.3	17	1.0
White spruce	19	1.7	40	0.1	33	1.0
Alternate leaved dogwood	19	1.1	40	1.1	17	0.1
White ash	19	0.6	20	0.5	50	0.2
Hobble-bush	13	2.4	40	0.9		
Common blackberry	13	1.6	40	1.3	17	0.1
Ironwood					33	1.6
Shrub Layer (Mean % Cover)		**27**		**35**		**26**
Evergreen wood fern	88	12.5	60	4.7	100	7.4
Hay scented fern	75	29.7	80	20.3	100	17.5
Wild lily of the valley	73	3.1	100	0.4	50	1.3
Rose twisted stalk	71	0.3	60	0.1		
Starflower	67	0.5	60	0.1	67	0.4
Violets	60	1.8	60	0.1	100	0.9
Wood aster	60	1.4	40	1.5	67	1.8
Wood sorrel	58	4.8	40	2.8	33	7.8
Sarsaparilla	58	2.2	80	1.6	50	4.2
Northern beech fern	50	0.3	40	0.3	33	0.5
Indian cucumber root	46	0.5	40	0.1	33	0.1
Wood reed	44	0.2	40	0.1	50	0.1
Eastern spreading wood fern	38	12.6	40	20.3	50	23.0
New York fern	38	2.3	20	0.7		
Drooping wood sedge	38	0.3	40	0.1	50	0.1
Lions paw	33	0.1	20	0.2		
Christmas fern	31	2.5			33	0.8
Painted trillium	31	0.2	60	0.1		
Shining club-moss	29	1.1	40	0.2	17	5.0
Bluebead lily	27	0.3	40	2.8	50	1.4
Indian pipe	27	0.1	60	0.1		
Fibrous-root sedge	21	0.4	40	0.1	17	0.1
Spinulose wood fern	17	15.0	40	1.0	17	8.0
Herb Layer (Mean % Cover)		**50**		**34**		**50**
Broom moss	67	1.0	40	0.8	67	1.3
Hypnum moss	48	1.4	60	0.1	67	0.8
Hair-cap moss	46	0.8	40	1.5	17	0.5
Fern moss	29	1.2			33	1.3
Bazzania	21	0.2			33	0.1
Schreber's moss	15	0.9	60	0.1	33	3.0
Wavy dicranum	4	0.1			33	0.1
Bryo-Lichen Layer (Mean % Cover)		**9**		**1**		**5**

Distinguishing Features

This is a hardwood forest dominated by sugar maple usually found on well drained soils on upper slopes. Hay-scented fern is usually present in quantity. Beech is abundant in TH1a and yellow birch is dominant in TH1b. Rose twisted stalk and three species of wood ferns are common.

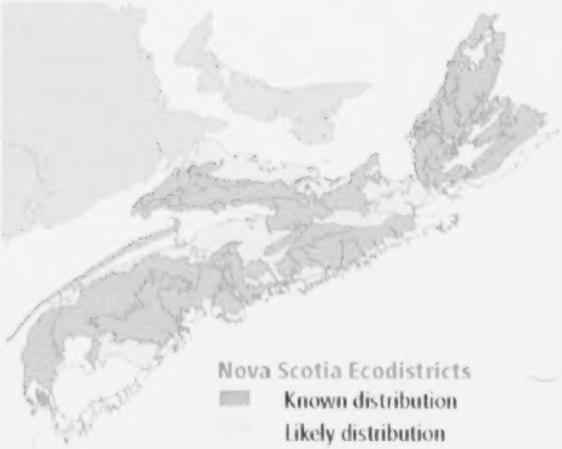
Dog tooth violet

Site Characteristics

Slope Position: Upper^{5} Level^{2} Middle^{2} Other^{1}
Surface Stoniness: (Non - Slightly)^{5} (Moderately)^{4} (Very - Excessively)^{1}
Bedrock Outcrop: (Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range: 22 - 337m
Slope Gradient: Gentle^{4} Level^{2} Steep^{2} Moderate^{1} nd^{1}
Aspect: North^{3} East^{2} South^{1} West^{2} None^{2}
Exposure: Mod. exposed^{1} Moderate^{3} Exposed^{2} Other^{1}
Microtopography: Strongly^{4} Moderately^{4} Slightly^{1} Other^{1}
Drainage: Well^{6} Moderately well^{3} Other^{1}

Soil Characteristics

Soil Type: ST2-L^{4} ST2^{3} ST8^{1} Other^{2}
Parent Material: Glacial till^{8} Till/Bedrock^{1} Other^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{3} (>45)^{5} nd^{1}
Duff Thickness (cm): (0-5)^{3} (6-10)^{4} (11-20)^{2} nd^{1}



Lake George, Yarmouth County

TH2

Sugar maple / New York fern – Northern beech fern

Acer saccharum / Thelypteris noveboracensis – Phegopteris connectilis

TH2a

Yellow birch variant

Betula alleghaniensis

n=48

Concept: This late successional Vegetation Type (VT) has an overstory dominated by sugar maple and yellow birch accompanied by a mix of mostly shade-tolerant trees. It is similar to TH1 (Sugar maple / Hay-scented fern), but is generally associated with moister and/or slightly more fertile sites. There is one variant (TH2a) where yellow birch is dominant in the overstory, often originating after disturbance has exposed mineral soil seedbeds. Due to the long-lived and shade-tolerant nature of dominant overstory trees, this VT will develop old forest characteristics that are maintained by gap disturbance. TH2 is one of several Acadian hardwood VTs found on zonal sites throughout Nova Scotia.

Vegetation: Sugar maple and yellow birch are the dominant overstory trees with lesser red maple and scattered red spruce, white spruce, beech and balsam fir. The shrub layer contains regenerating tree species along with striped maple, fly honeysuckle, beaked hazelnut and mountain maple. Dense striped maple coverage in this layer can sometimes exclude other species. Herb coverage is diverse, but generally dominated by New York fern, evergreen wood fern and northern beech fern. Other common species may include rose twisted stalk, Indian cucumber root, wood sorrel, drooping wood sedge and wood aster. Spring ephemerals may include spring beauty, Dutchman's-breeches and dog tooth violet. The bryophyte layer is poorly developed, with moss cover generally restricted to tree trunks, stones and downed woody material.

Environmental Setting: TH2 is mainly associated with fresh-moist, nutrient medium to rich soils of glacial origin. This VT is found throughout the province in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts and on the upper slopes of drumlins. However, TH2 is relatively uncommon on lowland ecodistricts, and does not occur in the Atlantic coastal ecoregion. The variant TH2a (Yellow birch) usually occurs on slightly moister sites and/or where past disturbance events have created suitable mineral soil seedbeds for regeneration. It is widespread and abundant across New Brunswick but somewhat rare on Prince Edward Island.

Successional Dynamics: TH2 is a late successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood. Excluding harvesting, stand level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind or ice damage. Following stand level disturbance, TH2 can develop from early and mid-successional VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern), IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern), IH7 (Red maple / Hay-scented fern – Wood sorrel), TH7 (Yellow birch – White birch / Evergreen wood fern) and TH8 (Red maple – Yellow birch / Evergreen wood fern). Early successional stages can also be by-passed if, at the time of disturbance, advanced sugar maple and yellow birch regeneration is retained.

Ecological Features

This matrix hardwood forest typically occurs over hundreds of hectares. The longevity, shade tolerance and deep roots of sugar maple and beech promote stand continuity, high old growth potential and uneven age structure. Stands on high elevation (greater than 200 m) crests and upper slopes are exposed to strong winds and are susceptible to ice storms, blowdown and crown breakage. Vernal pools, seeps and springs are common and may provide habitat for several amphibians (e.g. wood frogs). This forest may provide habitat for warblers, thrushes, woodpeckers, southern flying squirrels and small mammals. Large trees provide nest sites for barred owls and northern goshawks. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Hard mast from beech and beaked hazelnut provides a significant food source for bears, small mammals and birds. These forests host a variety of spring ephemeral plants.

Characteristic Plants

	TH2		TH2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Sugar maple	100	58.2	100	19.9
Yellow birch	87	16.5	100	53.8
Red maple	39	22.9	40	11.3
Balsam fir	26	9.9	50	6.2
Beech	21	6.8	40	9.3
White spruce	21	4.1	20	9.0
White birch	5	5.0	20	4.0
Tree Layer (Mean % Cover)		**87**		**88**
Striped maple	84	5.4	70	2.6
Sugar maple	82	8.9	80	1.6
Balsam fir	82	4.3	90	3.8
Fly honeysuckle	76	1.8	50	0.9
Beech	63	5.5	60	7.9
Yellow birch	63	1.7	40	0.1
Red maple	55	2.3	70	3.9
Mountain maple	45	1.2	20	1.1
Beaked hazelnut	37	1.8		
White spruce	37	0.8	50	6.1
Red spruce	32	1.4	10	7.0
White ash	29	0.5	10	0.1
Mountain ash	13	0.1	40	0.1
Shrub Layer (Mean % Cover)		**25**		**19**
Evergreen wood fern	89	7.8	100	11.8
Starflower	76	0.4	90	0.7
Rose twisted stalk	71	0.1	30	0.1
New York fern	68	34.6	90	26.2
Violets	66	1.2	40	1.1
Northern beech fern	63	2.9	60	0.9
Wood sorrel	63	1.2	80	6.1
Wild lily of the valley	61	1.1	60	5.8
Sarsaparilla	58	1.6	40	1.3
Christmas fern	55	1.9	20	10.3
Wood aster	55	0.5	30	0.4
Hay scented fern	45	15.2	30	11.7
Indian cucumber root	45	0.2	30	0.2
Dwarf raspberry	39	1.2	10	0.3
Drooping wood sedge	39	0.1		
Wood reed	37	0.1	20	0.1
Eastern spreading wood fern	32	14.1	50	8.5
Shinleaf	29	0.2	30	0.2
Spinulose wood fern	26	9.6	40	3.1
Bunchberry	24	1.8	70	11.2
Lady fern	24	0.7	10	2.5
Goldthread	21	2.8	80	1.3
Interrupted fern	11	1.3	30	1.1
Cinnamon fern	11	0.7	30	1.8
Twinflower	8	0.9	50	1.0
Herb Layer (Mean % Cover)		**59**		**70**
Broom moss	66	0.8	90	1.7
Hypnum moss	39	1.0	60	1.4
Fern moss	26	0.5	40	1.8
Stair-step moss	21	3.3	80	2.6
Hair cap moss	21	0.4	40	0.2
Bazzania	16	0.4	70	1.0
Schreber's moss	16	0.4	60	2.0
Common green sphagnum	11	0.5	30	1.1
Shaggy moss	8	0.2	30	0.2
Bryo-Lichen Layer (Mean % Cover)		**2**		**8**

Distinguishing Features

Soils are slightly moister in this sugar maple dominated hardwood forest on upper and middle slopes. New York fern and northern beech fern are usually present in quantity; other plants include fly honeysuckle, wood ferns, rose twisted stalk. Yellow birch is dominant in TH2a.

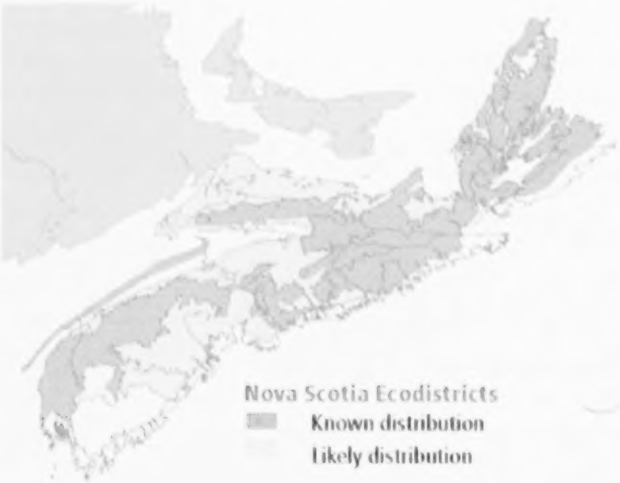
Northern beech fern

Site Characteristics

Slope Position:	Upper^{4} Middle^{3} Lower^{2} Other^{1}
Surface Stoniness:	(Non - Slightly)^{5} (Moderately)^{4} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	36 - 304m
Slope Gradient:	Gentle^{7} Moderate^{2} Level^{1}
Aspect:	North^{3} East^{3} South^{1} West^{3}
Exposure:	Mod. exposed^{4} Moderate^{3} Exposed^{2} Other^{1}
Microtopography:	Moderately^{5} Strongly^{2} Slightly^{1} Other^{2}
Drainage:	Moderately well^{5} Well^{4} Imperfect^{1}

Soil Characteristics

Soil Type:	ST2-L^{4} ST2^{2} ST8^{2} ST9^{1} Other^{1}
Parent Material:	Glacial till^{9} Colluvium^{1}
Rooting Depth (cm):	(<30)^{2} (30-45)^{3} (>45)^{5}
Duff Thickness (cm):	(0-5)^{2} (6-10)^{6} (11-20)^{2}



Lower Springfield,
Antigonish County

TH3

Sugar maple – White ash / Christmas fern

Acer saccharum – Fraxinus americana / Polystichum acrostichoides

n=40

Concept: This late successional Vegetation Type (VT) has an overstory dominated by sugar maple and white ash with lesser amounts of other shade-tolerant hardwoods. TH3 primarily occurs as rich, seepage patches within larger TH1 and TH2 forests. Plant species richness is among the highest of any upland hardwood ecosystem in the province. Due to the long-lived and shade-tolerant nature of dominant overstory trees, this VT will develop old forest characteristics maintained by gap disturbance. Sugar maple – White ash / Christmas fern is one of several Acadian hardwood VTs found on zonal sites throughout Nova Scotia.

Vegetation: Sugar maple, white ash and yellow birch are the dominant overstory trees accompanied by lesser amounts of red maple, beech and red spruce. Scattered ironwood is typical in the lower canopy or high shrub layer. Although ironwood and sometimes white ash are not dominant in the canopy, their presence is used to distinguish this VT from other sugar maple/yellow birch VTs. The shrub layer is dominated by regenerating hardwood, balsam fir and striped maple, with less prominent amounts of alternate-leaved dogwood, hobblebush and beaked hazelnut. Herb coverage is diverse and may include several rich site indicators including Christmas fern, oak fern, lady fern, shining club moss and northern beech fern. Spring ephemerals may include spring beauty, Dutchman's-breeches and dog tooth violet. The bryophyte layer is poorly developed, with moss cover generally restricted to tree trunks, stones and downed woody material.

Environmental Setting: TH3 is mainly found on fresh moist to moist, nutrient rich soils. These sites often occur in toe slope positions and mid slope benches, but are sometimes also found on enriched upper slopes. This VT is typically associated with (and found embedded within) larger tracts of TH1 and TH2 matrix forest. TH3 is found throughout the province in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts, and on some drumlin sites. It is very rare on Prince Edward Island but abundant and widespread in southern New Brunswick.

Successional Dynamics: TH3 is a late successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind or ice damage. Although TH3 sites generally maintain themselves through gap replacement, this VT can develop from other early and mid-successional VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern) and IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern).

Ecological Features

This hardwood seepage forest typically occurs in small patches (from less than 1 hectare up to 50 hectares), infrequently scattered as inclusions within broader hardwood matrix forest. Longevity of the overstory tree species increases the potential for old growth development. Vernal pools and moist surface depressions common in this seepage forest provides habitat for red-backed salamanders, yellow-spotted salamanders and wood frogs, while seeds of ash and maple trees may be eaten by evening grosbeaks. Plants that favour moist rich sites are common, including several rare species (e.g. lance-leaved and little grapeferns, foamflower and anise-root). These forests host a variety of spring ephemeral plants, like spring beauty, dog tooth violet and Dutchman's breeches which take advantage of early spring sunlight before tree leaf out. In southwest Nova Scotia this community is home to southern flying squirrels.

Characteristic Plants	TH3	
	Freq. (%)	Cover (%)
Sugar maple	100	38.4
White ash	93	16.0
Yellow birch	88	11.9
Beech	60	10.1
Red maple	45	21.1
Red spruce	28	7.9
Ironwood	23	6.2
Balsam fir	15	7.0
White spruce	15	1.2
Hemlock	13	9.2
White birch	10	4.3
Tree Layer (Mean % Cover)		**86**
Balsam fir	88	2.3
Sugar maple	85	8.9
White ash	83	3.5
Beech	78	15.6
Striped maple	73	4.6
Red spruce	53	2.9
Red maple	50	1.1
Fly honeysuckle	50	0.7
White spruce	48	1.9
Yellow birch	43	1.8
Beaked hazelnut	30	1.4
Shrub Layer (Mean % Cover)		**37**
Christmas fern	93	6.0
Evergreen wood fern	93	4.1
Starflower	83	0.5
Wild lily of the valley	68	1.6
Violets	60	2.4
Sarsaparilla	60	1.5
New York fern	55	14.8
Rose twisted stalk	53	0.1
Indian cucumber root	50	0.3
Northern beech fern	48	1.3
Partridge-berry	48	0.4
Wood aster	48	0.2
Lions paw	43	0.7
Hay-scented fern	40	7.8
Drooping wood sedge	38	0.1
Shining club-moss	35	1.0
Shinleaf	30	0.6
Indian pipe	30	0.1
Wood reed	30	0.1
Lady fern	25	1.3
Oak fern	25	1.3
Wood sorrel	25	1.2
False Solomon's seal	25	0.1
White lettuce	23	0.6
Calico aster	23	0.3
Common speedwell	23	0.2
Herb Layer (Mean % Cover)		**32**
Broom moss	85	1.0
Hypnum moss	58	1.6
Fern moss	58	1.1
Hair-cap moss	45	0.3
Stair-step moss	38	1.3
Schreber's moss	33	0.5
Bryo-Lichen Layer (Mean % Cover)		**4**

Distinguishing Features

In this rich hardwood forest found on middle to lower slope positions the herb layer is diverse and usually includes Christmas fern, northern beech fern, shining club-moss, lady fern and oak fern. White ash, ironwood and Christmas fern are diagnostic for this forest.

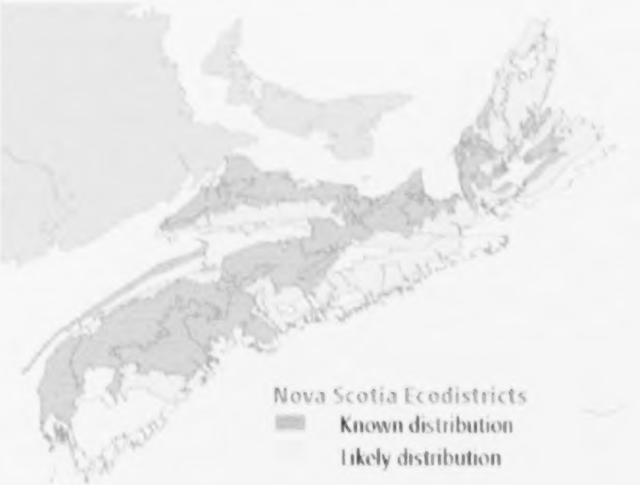
Christmas fern

Site Characteristics

Slope Position:	Middle^4 Lower^3 Upper^2 Other^1
Surface Stoniness:	(Non - Slightly)^4 (Moderately)^3 (Very - Excessively)^3
Bedrock Outcrop:	(Non-rocky)^8 (Slightly - Moderately)^2
Elevation Range:	57 - 237m
Slope Gradient:	Gentle^5 Moderate^2 Level^1 Steep^1 nd^1
Aspect:	North^2 East^3 South^3 West^2
Exposure:	Moderate^5 Mod. exposed^3 Mod. sheltered^1 Sheltered^1
Microtopography:	Moderately^5 Strongly^3 Slightly^1 Other^1
Drainage:	Moderately well^5 Well^3 Imperfect^2

Soil Characteristics

Soil Type:	ST8^3 ST2-L^2 ST2^1 ST9^1 ST11^1 ST2^1 Other^1
Parent Material:	Glacial till^8 Colluvium^1 Till/Bedrock^1 nd^1
Rooting Depth (cm):	(<30)^1 (30-45)^4 (>45)^4 nd^1
Duff Thickness (cm):	(0-5)^4 (6-10)^4 (11-40)^1 nd^1



Sandy Gunn Lake,
Pictou County

TH4

Sugar maple – White ash / Silvery spleenwort – Baneberry

Acer saccharum – Fraxinus americana /
Deparia acrostichoides – Actaea spp.

n=27

Concept: This late successional Vegetation Type (VT) has an overstory dominated by sugar maple, white ash and yellow birch. TH4 primarily occurs as a small patch VT on rich seepage sites embedded within larger tracts of TH1 and TH2 matrix forest. It is similar to TH3 (Sugar maple – White ash / Christmas fern), but is even more fertile, supporting numerous rich site indicator species. TH4 is the richest upland hardwood VT in Nova Scotia and, excluding floodplain forests, has the most diverse suite of understory plants. Due to the long-lived and shade-tolerant nature of dominant overstory trees, this VT will develop old forest characteristics which are maintained by gap disturbance. Sugar maple – White ash / Silvery spleenwort – Baneberry is one of several Acadian hardwood VTs found on zonal sites throughout Nova Scotia.

Vegetation: Sugar maple is the dominant overstory tree with lesser amounts of white ash and yellow birch. Scattered ironwood (when present) is typically found in the lower canopy or high shrub layer. The shrub layer is dominated by regenerating hardwood (mainly sugar maple) along with fly-honeysuckle, striped maple, mountain maple and beaked hazelnut. Alternate-leaved dogwood, if present, is diagnostic of this VT. Herb coverage is diverse and includes a suite of rich site indicators such as lady fern, sweet cicely, silvery spleenwort, wood goldenrod, Christmas fern, northern beech fern, red and white baneberry and oak fern. Spring ephemerals may include spring beauty, Dutchman's breeches and dog tooth violet. The bryophyte layer is poorly developed, with moss cover generally restricted to tree trunks, stones and downed woody material.

Environmental Setting: TH4 is found on fresh-moist to moist, nutrient rich soils associated with seepage sites. These sites often occur where slope angle decreases as in toe slope positions and mid-slope benches. This VT is typically associated with (and found embedded within) larger tracts of TH1 and TH2 matrix forest. TH4 is mainly found in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts. It is very rare on Prince Edward Island but abundant and widespread in southern New Brunswick.

Successional Dynamics: TH4 is a late successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood. Excluding harvesting, stand-level disturbance events are rare with gaps or small patches usually created by individual tree mortality, wind, or ice damage. Although TH4 sites generally maintain themselves through gap replacement, this VT can develop from other early and mid-successional VTs including IH3 (Large-tooth aspen / Christmas fern – New York fern) and IH5 (Trembling aspen – White ash / Beaked hazelnut / Christmas fern).

Ecological Features

This hardwood seepage forest typically occurs in small patches (less than 1 hectare up to 10 hectares), infrequently scattered as inclusions within broader hardwood matrix forest. Longevity of the overstory tree species increases the potential for old growth forest development. Vernal pools and moist surface depressions common in this seepage forest provide habitat for red-backed salamanders, yellow-spotted salamanders and wood frogs, while seeds of ash and maple trees may be eaten by evening grosbeaks. Plants that favour moist rich sites are common, including several rare species (e.g. lance-leaved and little grapeferns, foamflower and anise root). This forest has the highest fern diversity of all VTs in the TH group, with 13 species present at least 20% of the time. These forests also host a variety of spring ephemeral plants like spring beauty, dog tooth violet and Dutchman's breeches that take advantage of early spring sunlight before tree leaf out.

Characteristic Plants	TH4 Freq. (%)	TH4 Cover (%)
Sugar maple	100	56.3
Yellow birch	74	16.7
White ash	48	20.9
Beech	19	19.4
Red maple	19	7.0
White spruce	15	3.5
Balsam fir	11	9.3
Tree Layer (Mean % Cover)		**84**
Sugar maple	100	19.0
Fly honeysuckle	85	1.0
Striped maple	74	2.8
Yellow birch	63	4.6
Mountain maple	63	3.1
White ash	63	1.1
Balsam fir	59	1.4
Beech	56	11.2
Beaked hazelnut	52	3.5
White spruce	52	0.6
Alternate leaved dogwood	48	0.9
Shrub Layer (Mean % Cover)		**37**
Evergreen wood fern	96	6.8
Lady fern	78	4.2
Sarsaparilla	78	3.3
Wood aster	74	6.0
Northern beech fern	74	4.5
Wood-sorrel	74	1.7
Silvery spleenwort	70	7.0
Violets	70	2.0
Rose twisted stalk	70	0.4
Christmas fern	67	3.0
Wild lily of the valley	67	1.7
Wood reed	67	0.3
Starflower	59	0.4
Drooping wood sedge	59	0.2
Wood goldenrod	56	6.8
Red baneberry	48	0.5
Dwarf raspberry	44	3.1
White lettuce	44	0.1
Oak fern	41	2.8
Hairy sweet cicely	41	2.2
Eastern spreading wood fern	33	5.7
White baneberry	33	0.5
Braun's holly fern	33	0.3
Spinulose wood fern	30	9.3
Lions paw	30	0.8
Nodding trillium	30	0.1
New York fern	26	10.9
Hay scented fern	26	6.5
Rattlesnake fern	26	0.8
Bladder sedge	26	0.2
Bluebead lily	26	0.2
Dewey's sedge	26	0.1
Small bedstraw	26	0.1
Solomon's seal	26	0.1
White panicle aster	26	0.1
Herb Layer (Mean % Cover)		**52**
Broom moss	41	0.6
Fern moss	22	1.3
Bryo-Lichen Layer (Mean % Cover)		**2**

Distinguishing Features

This is the richest upland hardwood forest and occurs on moist, middle to lower slope positions. The abundance of white ash and ironwood is used as a diagnostic feature of this forest. The presence of silvery spleenwort, hairy sweet cicely and ostrich fern are diagnostic of this rich, seepage forest.

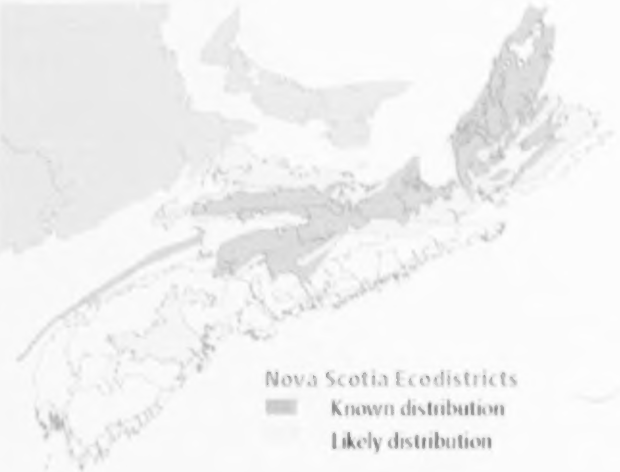
Red baneberry

Site Characteristics

Slope Position:	Lower³ Middle³ Upper² Crest¹ Level¹
Surface Stoniness:	(Non - Slightly)⁷ (Moderately)¹ (Very - Excessively)¹
Bedrock Outcrop:	(Non rocky)⁹ (Slightly - Moderately)¹
Elevation Range:	94 - 286m
Slope Gradient:	Gentle⁵ Moderate³ Level¹ Steep¹
Aspect:	North¹ East² South³ West³ None¹
Exposure:	Moderate³ Mod. exposed³ Exposed² Mod. Sheltered¹ Sheltered¹
Microtopography:	Moderately⁴ Slightly⁴ Strongly¹ Other¹
Drainage:	Well⁴ Moderately well⁴ Imperfect²

Soil Characteristics

Soil Type:	ST8⁴ ST9³ ST2-L¹ ST6¹ Other¹
Parent Material:	Glacial till⁷ Colluvium² Till/Bedrock¹
Rooting Depth (cm):	(<30)² (30-45)⁴ (>45)³ nd¹
Duff Thickness (cm):	(0-5)⁴ (6-10)³ (11-20)¹ (21-40)¹ nd¹



Twelve O'Clock Mountain,
Inverness County

TH5

Beech / Sarsaparilla / Leaf litter

Fagus grandifolia / Aralia nudicaulis

n=21

Concept: This late successional Vegetation Type (VT) has an overstory dominated by beech that can sometimes dominate the shrub layer. Other than beech, below canopy ground cover is typically sparse, aside from leaf litter on the forest floor. Prior to the introduction of beech bark canker, the long-lived and shade-tolerant nature of beech allowed this ecosystem to develop old forest characteristics maintained by gap disturbance. However, Beech / Sarsaparilla / Leaf litter is now relatively uncommon in the province.

Vegetation: Beech is the dominant overstory tree, with minor amounts of sugar maple, red maple and yellow birch. Species diversity and coverage in the shrub and herb layers are typically very low – a condition likely related to the phytotoxicity (toxicity to plants) of beech litter leachate. Some shrub and herb cover can be found under mixed species portions of the canopy. Understory species include regenerating trees, striped maple, sarsaparilla and a variety of ferns. Beech drops, a saprophytic plant, is also usually found. As in other tolerant hardwood VTs, the bryophyte layer is poorly developed, with moss cover generally restricted to tree trunks, stones and downed woody material.

Environmental Setting: TH5 is found on dry to fresh, nutrient-medium soils derived from glacial till or colluvium. This VT is mainly found in hilly topography associated with the Nova Scotia Uplands ecoregion and the North Mountain and South Mountain ecodistricts. It can also occur on the crests of drumlins. Beech / Sarsaparilla / Leaf litter is relatively uncommon in New Brunswick and on Prince Edward Island mature stands of this VT are absent.

Successional Dynamics: TH5 is a late successional, climatic climax VT dominated by beech. Excluding harvesting, stand-level disturbance events are rare with gaps or small patches usually created by individual tree mortality, wind, or ice damage. This VT has been significantly impacted by beech bark canker, and its future in the Acadian forest is uncertain. Trends suggest that other shade-tolerant hardwoods will eventually establish on these sites. At present most TH5 sites are even-aged, but eventual replacement by sugar maple, red maple and yellow birch will lead to a more uneven-aged condition. Progression to TH1 (Sugar maple / Hay-scented fern), TH2 (Sugar maple / New York fern – Northern beech fern) or TH7 (Red maple / Hay-scented fern – Wood sorrel) is likely.

Ecological Features

This closed canopy hardwood forest typically occurs in large patches. Beech scale disease, introduced from Europe in the 1890s, has decimated tree quality and mast production in these forests. Beech is very shade-tolerant and the impact of the disease has reduced this species to an intermediate or understory species, altering its ecological role in stand structure and dynamics. However, beech is still is an important food source for bears, small mammals, blue jays, finches, woodpeckers and yellow-bellied sapsuckers. Cavities in tree stems, often created when branches break off, provide nesting and denning habitat. Beech drops, a parasitic plant on beech roots, are often found wherever the tree grows. There is evidence of some genetic resistance to beech scale, thus mature, clean, trees may present conservation and restoration opportunities. These forests may host a variety of spring ephemeral plants, which take advantage of early spring sunlight before tree leaf out.

Characteristic Plants

	TH5 Freq. (%)	TH5 Cover (%)
Beech	100	58.1
Yellow birch	67	14.4
Red maple	67	12.6
Sugar maple	62	11.6
White birch	29	5.8
Balsam fir	24	4.2
White spruce	14	6.7
Hemlock	14	3.3
Red oak	10	7.5
Red spruce	10	7.5
White pine	10	7.5
Large-tooth aspen	10	7.0
White ash	10	4.0
Striped maple	10	2.5
Tree Layer (Mean % Cover)		**90**
Beech	90	16.3
Balsam fir	67	2.1
Striped maple	62	1.0
Red maple	52	2.0
Sugar maple	48	5.2
Fly honeysuckle	33	0.2
Mountain maple	24	3.7
White spruce	24	2.7
Shrub Layer (Mean % Cover)		**27**
Sarsaparilla	71	1.4
Wild lily-of-the-valley	67	1.5
Starflower	67	0.2
Evergreen wood fern	48	5.9
Hay-scented fern	48	1.2
Beech-drops	48	1.1
Wood aster	48	0.8
Eastern spreading wood fern	33	18.0
Bunchberry	33	1.3
Drooping wood sedge	33	0.4
Common speedwell	33	0.2
Rose twisted stalk	33	0.1
New York fern	29	14.8
Christmas fern	29	3.1
Wood sorrel	29	1.4
Violets	29	0.2
Partridge-berry	29	0.1
Goldthread	24	0.5
Bluebead lily	24	0.1
Indian pipe	24	0.1
Herb Layer (Mean % Cover)		**23**
Broom moss	76	1.4
Hypnum moss	62	1.2
Hair-cap moss	57	0.7
Schreber's moss	43	1.3
Fern moss	38	1.5
Bazzania	29	0.1
Stair-step moss	24	1.3
Bryo-Lichen Layer (Mean % Cover)		**4**

Distinguishing Features

Located on rapid to well drained soils of crests and upper slopes this hardwood forest is dominated by beech. Shrub and herb coverage is sparse and the forest floor is primarily beech leaf litter. Beech drops are common. Beech canker scars on all age classes of beech is usually evident.

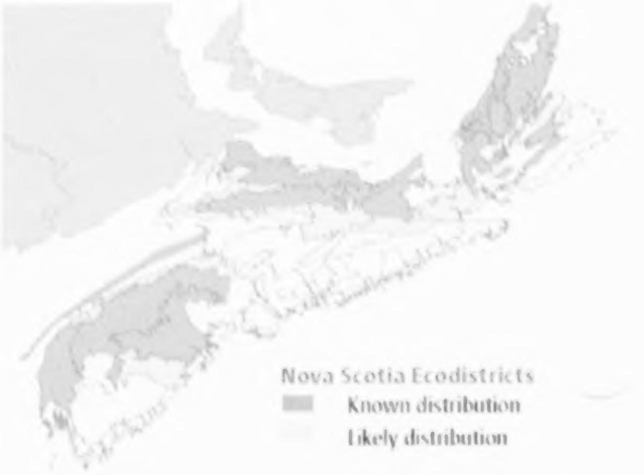
Diseased beech

Site Characteristics

Slope Position: Upper^{7} Middle^{2} Other^{1}
Surface Stoniness: (Non - Slightly)^{7} (Very - Excessively)^{1} (Moderately)^{2}
Bedrock Outcrop: (Non-rocky)^{8} (Slightly - Moderately)^{2}
Elevation Range: 69 - 357m
Slope Gradient: Gentle^{4} Steep^{4} Level^{1} Moderate^{1}
Aspect: North^{2} East^{4} South^{3} West^{1}
Exposure: Mod. exposed^{4} Exposed^{3} Moderate^{2} Other^{1}
Microtopography: Moderately^{4} Strongly^{3} Slightly^{2} Level^{1}
Drainage: Well^{8} Rapid^{1} Other^{1}

Soil Characteristics

Soil Type: ST2^{4} ST8^{3} ST2-L^{1} Other^{2}
Parent Material: Glacial till^{7} Colluvium^{2} Till/Bedrock^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{2} (>45)^{6} nd^{1}
Duff Thickness (cm): (0-5)^{3} (6-10)^{3} (11-20)^{3} nd^{1}



TH6

Red oak – Yellow birch / Striped maple

Quercus rubra – Betula alleghaniensis / Acer pensylvanicum

n=11

Baker Settlement,
Lunenburg County

Concept: This mid to late successional Vegetation Type (VT) has an overstory dominated by red oak and yellow birch with lesser amounts of other species. Red oak's co-dominance with other hardwoods defines this VT. Due to the long-lived and shade-tolerant nature of dominant overstory trees, TH6 can develop old forest characteristics that are maintained by gap disturbance. However disturbance regimes associated with this VT are variable.

Vegetation: Red oak and yellow birch are the dominant overstory trees, with lesser amounts of sugar maple and/or red maple. Scattered beech, balsam fir, white birch, red spruce and white pine are also common. The shrub layer contains regenerating tree species (especially red oak) along with striped maple. Balsam fir can be locally abundant, but the balsam fir woolly adelgid often keeps this species from advancing into the overstory. A diverse and extensive herb layer is characterized by sarsaparilla, Indian cucumber root, partridge-berry, bunchberry and hay-scented fern. The bryophyte later is discontinuous and species poor, especially where the forest floor is characterized by leaf litter and/or where the softwood component is low.

Environmental Setting: TH6 is mainly associated with dry to moist, nutrient medium soils of glacial origin. It occurs primarily on the upper and middle slopes of gentle to hilly terrain in the Western ecoregion, but may be scattered elsewhere. It is uncommon in New Brunswick and very rare on Prince Edward Island.

Successional Dynamics: TH6 is a mid to late successional hardwood VT that may have even-aged or uneven-aged structure, depending on disturbance history. The mechanism for maintenance of red oak in this VT is not fully understood, although low-intensity spring fires are thought to play a role. Increased presence of red maple and/or white birch generally indicates more intense past disturbances. Early successional stages can include IH4 (Trembling aspen / Wild raisin – Bunchberry) and IH6 (White birch – Red maple / Sarsaparilla – Bracken). On drier sites, TH6 may be the climax VT, while on more mesic sites TH6 may succeed to TH1 (Sugar maple / Hay-scented fern) or TH2 (Sugar maple / New York fern – Northern beech fern) in the absence of fire.

Ecological Features

In western Nova Scotia, this forest is distributed as a large patch spanning several hundred hectares. Longevity and high shade tolerance promote old growth potential. Beech scale disease, introduced from Europe in the 1890s, has decimated the beech component of these stands and reduced mast production. This forest may provide habitat for warblers, thrushes, woodpeckers, flying squirrels and fishers. Large trees may provide nest sites for barred owls and northern goshawks, while downed coarse woody debris can provide cover for red-backed salamanders and small mammals. Hard mast from beech, oak and beaked hazelnut provides significant food for bears, squirrels, chipmunks, small mammals and birds. Oak regeneration is favoured as browse by deer. Generally oak regeneration performs poorly in the understory unless enhanced by fire. Oak is the preferred host of maitake, or hen-of-the-woods, a prized edible mushroom. Black trumpet mushrooms may also be found as mycorrhizal partners with oak and beech.

Characteristic Plants

	TH6	
	Freq. (%)	Cover (%)
Red oak	100	26.1
Yellow birch	91	22.9
Sugar maple	82	13.7
Red maple	64	24.1
White birch	55	9.3
Beech	45	19.6
White ash	27	8.3
Balsam fir	27	6.3
Tree Layer (Mean % Cover)		**93**
Balsam fir	100	2.8
Striped maple	100	2.5
Red oak	100	1.3
Red maple	82	2.2
Yellow birch	73	0.3
Sugar maple	64	7.0
White pine	64	1.5
Beech	55	4.5
Red spruce	36	2.4
Velvet-leaf blueberry	36	0.9
White spruce	36	0.3
Hemlock	27	1.4
Serviceberry	27	0.2
Wild raisin	27	0.1
Shrub Layer (Mean % Cover)		**20**
Sarsaparilla	82	1.6
Wild lily-of-the-valley	82	0.6
Bunchberry	73	2.5
Partridge berry	73	1.2
Starflower	73	0.9
Indian cucumber root	73	0.3
Bluebead lily	64	0.1
Hay-scented fern	55	9.5
Evergreen wood fern	55	0.4
Indian pipe	55	0.1
Christmas fern	45	6.1
Goldthread	45	2.1
Violets	45	0.2
Rose twisted stalk	45	0.1
Wood aster	36	11.7
Shinleaf	36	0.9
Bristly club moss	36	0.6
Ground pine	36	0.4
False Solomon's seal	36	0.1
Lions paw	36	0.1
New York fern	27	18.4
Bracken	27	3.0
Large-leaved aster	27	0.2
Painted trillium	27	0.1
Teaberry	27	0.1
Herb Layer (Mean % Cover)		**34**
Hair-cap moss	82	2.3
Stair-step moss	82	1.2
Broom moss	64	1.3
Schreber's moss	64	0.5
Hypnum moss	45	3.0
Bazzania	27	2.0
Fern moss	27	0.2
Bryo-Lichen Layer (Mean % Cover)		**6**

Distinguishing Features

Red oak and at least one northern hardwood species (yellow birch, sugar maple, beech) in the upper canopy of this hardwood forest is diagnostic for classification. TH6 forest is typical of western Nova Scotia and usually found on drier soils than the other TH forests.

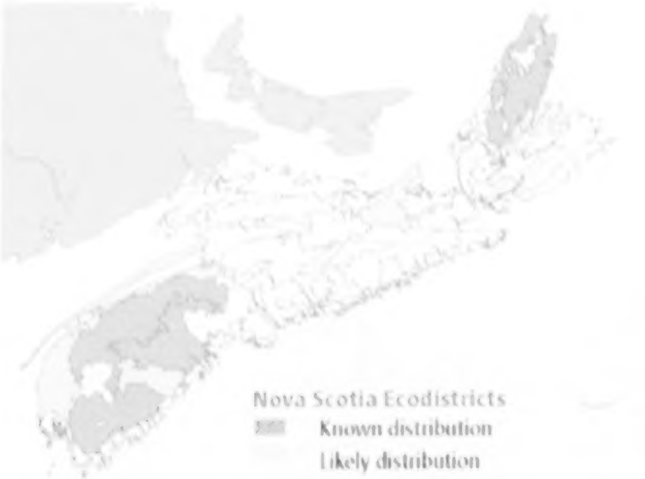
Cancer root

Site Characteristics

Slope Position:	Upper^7 Middle^1 Crest^1 Level^1
Surface Stoniness:	(Non - Slightly)^4 (Moderately)^4 (Very - Excessively)^2
Bedrock Outcrop:	(Non rocky)^{10}
Elevation Range:	50 - 201m
Slope Gradient:	Gentle^6 Steep^2 Level^1 Moderate^1
Aspect:	North^1 East^1 South^1 None^7
Exposure:	Moderate^5 Exposed^2 Mod. exposed^2 Mod. Sheltered^1
Microtopography:	Moderately^3 Strongly^3 Level^2 Severely^1 Ultra^1
Drainage:	Well^7 Moderately well^2 Rapid^1

Soil Characteristics

Soil Type:	ST2^4 ST2-G^2 ST8^2 ST1^1 ST2-L^1
Parent Material:	Glacial till^7 Colluvium^2 nd^1
Rooting Depth (cm):	(<30)^1 (30-45)^5 (>45)^3 nd^1
Duff Thickness (cm):	(0-5)^4 (6-10)^4 (11-20)^1 nd^1



Hornes Road
Cape Breton County

TH7

Yellow birch – White birch / Evergreen wood fern

Betula alleghaniensis – Betula papyrifera / Dryopteris intermedia

n=11

Concept: This mid-successional Vegetation Types VT has an overstory dominated by yellow birch with a strong component of white birch. Balsam fir is also common in both the overstory and understory – its dominance in either layer reflects the time elapsed since the last major insect disturbance (spruce budworm or tussock moth). Yellow birch – White birch / Evergreen wood fern is mainly found in the eastern Nova Scotia.

Vegetation: Yellow birch and white birch are the dominant overstory trees, with lesser amounts of balsam fir, red maple and white spruce. Scattered sugar maple, red spruce and beech are also typical. Balsam fir, and sometimes red maple, is prominent in the shrub layer with red maple also common in some stands. The herb layer has extensive fern cover including wood ferns, hay-scented fern, northern beech fern, bracken and New York fern. Other common plants include wild lily-of-the-valley, bunchberry, wood sorrel, sarsaparilla and gold thread. The bryophyte later is discontinuous and species-poor, especially where the forest floor is characterized by leaf litter and/or where the softwood component is low.

Environmental Setting: TH7 is mainly associated with fresh, nutrient medium soils of glacial origin. This VT is primarily found in eastern Nova Scotia and Cape Breton. TH7 is similar but ecologically distinct from HL4 (Birch / Wood fern – Wood sorrel), a transition forest occurring on upper slopes adjacent to the Cape Breton Highlands plateau. It is common in New Brunswick but rare on Prince Edward Island.

Successional Dynamics: TH7 is a mid-successional hardwood VT that follows partial stand-level disturbance in mixedwood forests such as MW1 (Red spruce – Yellow birch / Evergreen wood fern), MW4 (Balsam fir – Red maple / Wood sorrel – Goldthread) and MW5 (White birch – Balsam fir / Sarsaparilla – Bracken). The softwood component in these mixedwood stands has been removed either by harvesting or insect/disease. TH7 may also originate after partial harvesting in TH1 (Sugar maple / Hay-scented fern), TH2 (Sugar maple / New York fern – Northern beech fern) and IH7 (Red maple / Hay-scented fern – Wood sorrel) stands.

Ecological Features

This closed canopy hardwood forest frequently occurs in small patches, most of which are inclusions within broader hardwood matrix forest. Yellow birch's longevity and intermediate shade tolerance facilitates the development of uneven-aged canopy structures particularly as white birch trees are eliminated through natural mortality.

Yellow birch can produce stems more than 25 meters tall with diameters of up to 100 cm, and it has the ability to withstand severe crown breakage and rotting. Large diameter, living, hollow trees are common in this forest type and provide good denning sites, cavity nest sites for songbirds, and nest sites for broad-winged hawks and northern goshawks.

Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Birch seeds and catkins are an abundant food source during the winter for many species of birds (e.g. ruffed grouse) and small mammals. Birch trees may be deformed by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.

Characteristic Plants

	TH7	
	Freq (%)	Cover (%)
Yellow birch	100	45.3
White birch	100	20.4
Balsam fir	82	10.3
Red maple	45	7.2
White spruce	36	4.0
Beech	18	10.0
Sugar maple	18	5.0
Red spruce	18	2.5
Tree Layer (Mean % Cover)		**83**
Balsam fir	91	6.9
Red maple	82	3.6
Sugar maple	45	0.9
Striped maple	45	0.6
Fly honeysuckle	36	0.4
White spruce	36	0.3
Velvet-leaf blueberry	36	0.1
White birch	27	3.4
Mountain maple	27	0.2
Shrub Layer (Mean % Cover)		**19**
Evergreen wood fern	91	7.1
Wild lily of the valley	91	5.1
Bunchberry	82	9.9
Wood-sorrel	73	4.4
Starflower	73	0.8
Indian pipe	73	0.1
Eastern spreading wood fern	64	12.8
Sarsaparilla	64	3.3
Goldthread	64	2.4
Bluebead lily	64	0.9
Wood aster	64	0.1
Hay-scented fern	55	13.8
Bracken	45	4.8
New York fern	45	2.9
Twinflower	45	1.2
Northern beech fern	36	1.8
Spinulose wood fern	36	1.5
Drooping wood sedge	36	0.1
Rose twisted stalk	27	0.2
Bristly club-moss	27	0.1
Ground pine	27	0.1
Shining club-moss	27	0.1
Herb Layer (Mean % Cover)		**46**
Schreber's moss	100	3.5
Broom moss	91	2.0
Stair-step moss	82	4.4
Bazzania	73	1.3
Hypnum moss	55	1.1
Shaggy moss	18	1.3
Shaded wood moss	18	1.1
Hair-cap moss	18	0.1
Bryo-Lichen Layer (Mean % Cover)		**11**

Distinguishing Features

This hardwood forest is dominated by yellow and white birch with only a scattering of other hardwood species. Balsam fir can be abundant in both the canopy and understory layers. It is primarily found in eastern Nova Scotia. Several species of ferns create extensive ground cover.

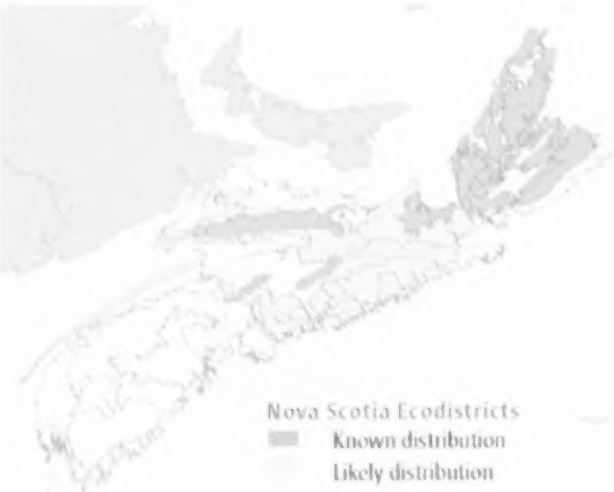
Hobble-bush

Site Characteristics

Slope Position: Upper^{9} Middle^{1}
Surface Stoniness: (Moderately)^{5} (Non - Slightly)^{4} (Very - Excessively)^{1}
Bedrock Outcrop: (Non rocky)^{7} (Slightly - Moderately)^{3}
Elevation Range: 51 - 336m
Slope Gradient: Gentle^{7} Moderate^{2} Steep^{1}
Aspect: North^{4} East^{1} West^{5}
Exposure: Exposed^{1} Mod. exposed^{1} Moderate^{7}
Microtopography: Moderately^{8} Severely^{1} Slightly^{1}
Drainage: Moderately well^{6} Well^{3} Rapid^{1}

Soil Characteristics

Soil Type: ST2-L^{6} ST2^{2} ST15^{1} nd^{1}
Parent Material: Glacial till^{8} Colluvium^{1} Till/Bedrock^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{3} (>45)^{5} nd^{1}
Duff Thickness (cm): (0-5)^{1} (6-10)^{6} (11-20)^{2} nd^{1}



Nova Scotia Ecodistricts
▨ Known distribution
Likely distribution

Twin Lakes, Guysborough County

TH8

Red maple – Yellow birch / Striped maple

Acer rubrum – Betula alleghaniensis / Acer pensylvanicum

TH8a

White ash variant

Fraxinus americana

n=52

Concept: This mid to late successional Vegetation Type (VT) has an overstory dominated by red maple and yellow birch. Sugar maples are noticeably absent or only present as a minor structural component. The variant (TH8a) defines stands where white ash is present in the overstory, a reflection of increased moisture and/or fertility. In the eastern mainland, TH8 is a late successional VT; elsewhere in Nova Scotia it is considered mid-successional.

Vegetation: Red maple and yellow birch are the dominant overstory trees, but most stands also have a minor softwood component comprised of balsam fir, red spruce and/or white spruce. In the shrub layer these roles reverse with softwood regeneration dominant (especially balsam fir). Other shrubs include striped maple, mountain maple and fly-honeysuckle. The herb layer has extensive fern cover including wood ferns, hay-scented fern and New York fern. Other common plants include bunchberry, wood sorrel and gold thread. The bryophyte later is discontinuous and species-poor, especially where the forest floor is characterized by leaf litter and/or where the softwood component is low.

Environmental Setting: TH8 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of glacial origin. It is found primarily in eastern Nova Scotia on upper and middle slopes of gentle terrain and on the drumlins of the Eastern Interior, Mulgrave Plateau and Bras d'Or Lowlands ecodistricts. However, it can be found scattered throughout Nova Scotia on similar sites. This VT is widespread and common throughout the Acadian Forest Region.

Successional Dynamics: TH8 is a mid to late successional climatic climax hardwood VT dominated by red maple and yellow birch. Stands are predominantly even-aged but can develop uneven-aged canopy structures with time. Disturbance agents include wind, ice damage, insects/disease and harvesting. In eastern Nova Scotia, early successional VTs include IH4 (Trembling aspen / Wild raisin / Bunchberry), IH6 (White birch – Red maple / Sarsaparilla – Bracken) and IH7 (Red maple / Hay-scented fern – Wood sorrel). Early successional stages can be by-passed if, at the time of disturbance, advanced red maple and yellow birch regeneration is retained. In the Nova Scotia Uplands ecoregion where sugar maple occurs, later successional VTs include TH1 (Sugar maple / Hay-scented fern) and TH2 (Sugar maple / New York fern – Northern beech fern).

Ecological Features

Across eastern Nova Scotia, this closed canopy hardwood forest is distributed as a large patch spanning several hundred hectares. Yellow birch's longevity and shade tolerance facilitates the development of uneven-aged stand structures. The tree can produce stems 25 meters tall with diameters of up to 100 cm, and has the ability to withstand severe crown breakage and rotting. Large diameter, living, hollow trees are common in this forest type and provide good denning opportunities, cavity nest sites for songbirds, and nest sites for broad-winged hawks and northern goshawks. Downed coarse woody debris may provide cover for red-backed salamanders and small mammals. Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals, while red maple is an important early spring pollen source. Birch trees may be deformed by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.

Characteristic Plants	TH8		TH8a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Yellow birch	100	33.2	86	6.7
Red maple	98	37.5	100	34.0
Sugar maple	40	6.2	57	10.8
Balsam fir	33	7.0	29	10.0
Red spruce	29	7.2	29	5.0
White birch	29	2.9	43	7.3
Beech	22	8.3	14	5.0
White spruce	20	6.8	29	0.1
White ash	9	3.8	86	25.5
Hemlock	4	3.0	14	5.0
Large tooth aspen	2	4.0	14	5.0
Ironwood			71	4.0
Striped maple			14	3.0
Tree Layer (Mean % Cover)		**82**		**81**
Balsam fir	98	9.1	100	3.9
Red maple	82	3.5	86	1.9
Yellow birch	76	1.8	57	0.6
Striped maple	60	4.1	100	2.2
Sugar maple	56	1.9	71	1.5
White spruce	44	1.9	71	1.5
Red spruce	42	10.4	57	3.5
Beech	40	6.5	14	0.1
Fly honeysuckle	36	1.5	71	0.2
Mountain maple	27	1.7	71	0.4
Wild raisin	18	0.2	57	0.1
White ash	13	5.1	100	1.0
Beaked hazelnut	4	1.8	57	5.3
Ironwood			29	4.9
Shrub Layer (Mean % Cover)		**27**		**19**
Evergreen wood fern	91	8.7	100	9.2
Wild lily of the valley	84	3.2	86	2.0
Goldthread	73	3.1	86	0.4
Hay-scented fern	71	11.9	43	25.0
Starflower	67	0.6	100	1.0
Bunchberry	62	8.8	43	0.2
Sarsaparilla	58	1.6	86	0.9
New York fern	56	13.4	71	6.3
Wood aster	53	0.5	43	1.1
Wood sorrel	51	4.7	71	0.7
Rose twisted stalk	49	0.1	43	0.1
Twinflower	47	3.2		
Violets	44	0.5	29	6.5
Painted trillium	38	0.1	14	0.1
Indian cucumber root	36	0.1	43	0.1
Cinnamon fern	33	0.4	29	0.5
Northern beech fern	24	1.0	86	2.0
Christmas fern	20	2.7	86	3.2
Interrupted fern	16	0.3	57	3.1
Lady fern	9	0.6	57	1.1
Herb Layer (Mean % Cover)		**50**		**43**
Broom moss	82	1.4	86	1.4
Hypnum moss	69	1.7	86	4.7
Stair-step moss	64	3.3	57	1.6
Bazzania	62	2.4	43	1.7
Hair cap moss	62	0.7	57	0.1
Schreber's moss	53	2.4	14	0.3
Prickly sphagnum	2	0.5	29	12.5
Bryo-Lichen Layer (Mean % Cover)		**9**		**18**

Distinguishing Features

This forest is common in eastern Nova Scotia on well drained upper slopes. The absence or sparse cover of sugar maple and beech is diagnostic. Evergreen wood fern is typically the most abundant fern, although New York can also be locally extensive.

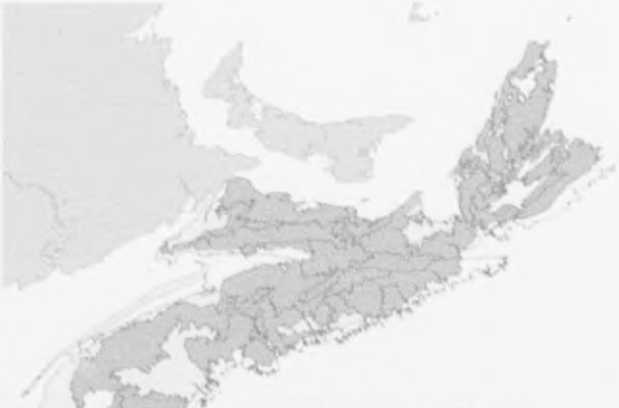
Striped maple

Site Characteristics

Slope Position: Upper^{4} Middle^{3} Level^{2} Other^{1}
Surface Stoniness: (Non - Slightly)^{4} (Moderately)^{4} (Very - Excessively)^{2}
Bedrock Outcrop: (Non rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range: 19 - 286m
Slope Gradient: Gentle^{6} Moderate^{2} Other^{1} nd^{1}
Aspect: North^{3} East^{1} South^{2} West^{1} None^{1}
Exposure: Moderate^{4} Mod. exposed^{4} Exposed^{1} Sheltered^{1}
Microtopography: Moderately^{4} Strongly^{3} Slightly^{2} Other^{1}
Drainage: Moderately well^{4} Well^{4} Imperfect^{2}

Soil Characteristics

Soil Type: ST2^{3} ST2-L^{3} ST6^{1} ST8^{1} Other^{2}
Parent Material: Glacial till^{9} Other^{1}
Rooting Depth (cm): (<30)^{1} (30-45)^{5} (>45)^{3} nd^{1}
Duff Thickness (cm): (0-5)^{2} (6-10)^{6} (11-20)^{1} nd^{1}



Nova Scotia Ecodistricts
🟩 Known distribution
▨ Likely distribution

WC Wet Coniferous Forest Group

(n = 177)

WC1 Black spruce / Cinnamon fern / Sphagnum

WC2 Black spruce / Lambkill – Labrador tea / Sphagnum. . . **WC2a** Huckleberry – Inkberry variant

WC3 Jack pine – Black spruce / Rhodora / Sphagnum. . . . . . **WC3a** Black spruce variant

WC4 Red pine – Black spruce / Huckleberry – Rhodora / Sphagnum

WC5 Red spruce – Balsam fir / Cinnamon fern / Sphagnum

WC6 Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum

WC7 Tamarack – Black spruce / Lambkill / Sphagnum . . . . . **WC7a** Huckleberry – Inkberry variant

WC8 Hemlock / Cinnamon fern – Sensitive fern / Sphagnum

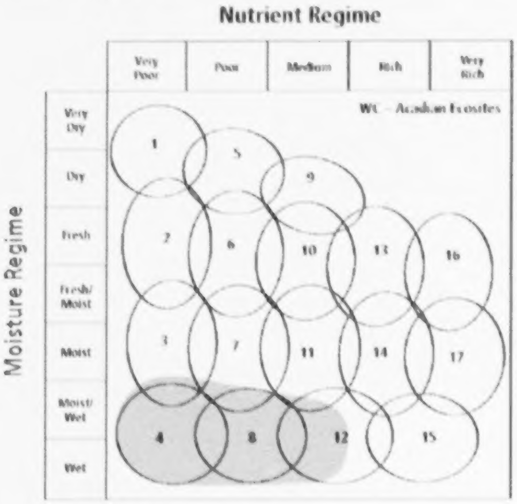
Concept: These are wet forest ecosystems with water at or near the surface for most of the year. They are generally dominated by softwood species such as black spruce, tamarack and balsam fir with an understory of plants tolerant of wet, acidic (nutrient poor) soils. They usually occur on moderately exposed, level to depressional topography with soils derived from either mineral or organic parent material. All Vegetation Types (VT) are found in the Acadian Ecosite group, with black spruce dominated VTs also found in the Maritime Boreal Ecosite group.

Vegetation: Crown closure can be moderate to high in VTs of this group, but some stands only support widely spaced trees. Black spruce is the main overstory species, with other VTs distinguished by tamarack, jack pine, red pine, balsam fir, red spruce and/or hemlock cover. The shrub layer is usually well developed with ericaceous species, false holly and winterberry. Characteristic herbs include cinnamon fern, creeping snowberry and several sedge species. Sphagnum moss coverage is generally extensive.

Environmental Setting: Vegetation types in this group are found on upper and lower flats, lower and toe positions of gentle slopes, shallow depressions and riparian zones. Most sites have little (if any) exposed bedrock, but surface stoniness can be variable. Soils are generally derived from glacial till and/or organic deposits. Fertility is generally low except where nutrient availability is enhanced by ground water or seepage inputs. Rooting depth is strongly limited by high water levels. VTs can form small to large patches (and sometimes matrix forests) on the landscape. This group is found throughout the province, but is prominent in the Northumberland Bras d'Or Lowlands (500), Valley and Central Lowlands (600) and Atlantic Coastal ecoregions as well as the Sable (760) ecodistrict.

Successional Dynamics: These wet coniferous forests are mainly edaphic climax communities limited by excessive moisture and low fertility. Fluctuating water levels, windthrow, insects and disease are significant disturbance agents. Stands within a given VT may display a range of development stages depending on disturbance history and natural senescence.

Edatopic Grids


Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
WC – Acadian Ecosites
Moisture Regime
Very Dry
Dry
Fresh
Fresh/Moist
Moist
Moist/Wet
Wet
1
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9
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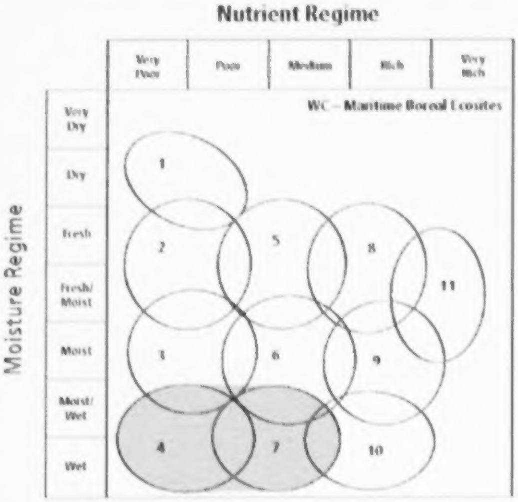
Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
WC – Maritime Boreal Ecosites
Moisture Regime
Very Dry
Dry
Fresh
Fresh/Moist
Moist
Moist/Wet
Wet
1
2
5
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10

Ecological Features

These small to large patch forests usually develop on wet organic or mineral soils, but are occasionally found on moist upland sites. Wet coniferous forests receive water from precipitation, springs, seepage or surface flows. Water flows and nutrient inputs in this group are lower than those in wet deciduous forests, while peat accumulation is generally higher. These forests make important contributions to landscape diversity, carbon and water budgets. They can provide habitat for numerous plants, lichens, invertebrates and vertebrates (including moose, spruce grouse, rusty blackbird, swamp and Lincoln's sparrows, wood turtle and several amphibians). Edaphic climax forests in this group are self sustaining, and many express long term ecological continuity and old growth characteristics. Wetter stands may persist as woodlands, with stunted and widely spaced trees.

*Tyndal Road,
Cumberland County*

WC1

Black spruce / Cinnamon fern / Sphagnum

Picea mariana / Osmunda cinnamomea / Sphagnum spp.

n=65

Concept: The Black spruce / Cinnamon fern / Sphagnum forest is characterized by black spruce canopy dominance, moderate to high herbaceous cover, and by a well developed layer of sphagnum mosses. It is found on wet, nutrient poor soil, persisting as an edaphic climax. This Vegetation Type (VT) is similar to WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum), which is an even more nutrient poor ecosystem found on sites with further reduced ground and surface water flow.

Vegetation: Crown closure is moderate to high, although some stands support more widely spaced trees. The canopy is heavily dominated by black spruce, or infrequently by hybrid black spruce-red spruce, with lesser balsam fir. Other trees are sparsely scattered with low cover. The understory supports low to moderate levels of woody species but higher herbaceous cover. Characteristic vascular plants include false holly, cinnamon fern, creeping snowberry, goldthread and three seeded sedge. Bryophyte development is high, composed of sphagnum moss and lesser amounts of common upland species. Ladies' tresses and/or pale fat-leaved sphagnum, with small pockets of common green or flat topped sphagnum, are common.

Environmental Setting: This is a nutrient poor wet forest that occasionally develops on moist sites. Soils are usually derived from glacial till or organic deposits with minor ground and/or surface water flow. It is found in shallow depressions and on flats and gentle slopes with very little microtopography. Sloped occurrences are usually cooler aspects. Rooting potential is strongly limited by high water levels. Most stands are in the Eastern and Northumberland/Bras d'Or ecoregions, with outliers scattered throughout the remainder of the province. WC1 is widespread and abundant across the Maritime Provinces.

Successional Dynamics: This ecosystem can be expressed at a variety of successional stages, but most stands are mid successional. It is a type of edaphic climax, largely maintained by limiting site conditions. Tree windthrow and uprooting are the primary mechanisms of renewal, but many stands have a history of timber harvest. WC1 does not shift to other vegetation types after major disturbance, but does change in development stage. Between stand level disturbance events, natural senescence can create uneven-aged stands. Vegetative layering is the dominant form of black spruce regeneration.

Ecological Features

This small patch ecosystem has variable crown closure and height but dense herbaceous and bryophyte cover. Productivity is generally low, although stands on richer sites may support higher species richness, including some rare plants (e.g. showy lady's slipper, alder leaved buckthorn, black ash, brittle stem sphagnum and golden ragwort). Vegetation is slow growing, limiting its forage value for herbivorous wildlife, although WC1 can provide summer thermal cover for moose, winter cover for deer, habitat for amphibians, and can support other unique habitat features. Wet forests contribute to carbon and nitrogen budgets and are often associated with headwaters, functioning to regulate water flow, provide filtration and recharge groundwater. These forests can sustain old growth conditions which are easily overlooked due to the generally small trees. It can support prominent levels of dwarf mistletoe and associated witches broom.

Characteristic Plants	WC1 Freq. (%)	WC1 Cover (%)
Black spruce	91	43.4
Balsam fir	60	9.3
Red maple	51	7.6
Tamarack	34	7.0
White pine	17	6.4
Tree Layer (Mean % Cover)		**57**
False holly	89	4.7
Black spruce	86	7.8
Lambkill	85	1.9
Balsam fir	82	4.8
Red maple	82	1.3
Wild raisin	65	1.6
Velvet-leaf blueberry	49	1.3
Labrador tea	38	1.6
Lowbush blueberry	35	1.1
Serviceberry	23	0.2
Mountain-ash	20	0.1
Shrub Layer (Mean % Cover)		**23**
Bunchberry	92	4.7
Cinnamon fern	88	26.0
Goldthread	82	3.6
Creeping snowberry	80	2.4
Three-seeded sedge	65	8.4
Sarsaparilla	46	1.0
Wild lily-of-the-valley	43	0.9
Bracken	40	7.6
Twinflower	38	2.9
Starflower	38	0.4
Pink lady's slipper	34	0.1
Bluebead lily	29	0.6
Three-leaved false Solomon's seal	26	2.6
Painted trillium	25	0.1
Dwarf raspberry	22	1.0
Indian pipe	22	0.1
New York fern	20	8.7
Herb Layer (Mean % Cover)		**49**
Schreber's moss	98	25.5
Stair-step moss	75	7.1
Bazzania	75	4.3
Ladies' tresses	57	17.9
Pale fat-leaved sphagnum	48	32.7
Flat-topped sphagnum	42	18.4
Wavy dicranum	42	2.2
Broom moss	37	1.4
Grey reindeer lichen	34	0.5
Common green sphagnum	32	26.2
Hair-cap moss	32	0.9
Plume moss	28	2.4
Hypnum moss	23	1.0
Cup lichens	22	0.6
Bryo-Lichen Layer (Mean % Cover)		**91**

Distinguishing Features

This poorly drained softwood forest of black spruce usually occurs in a peatland setting (peat deeper than 40 cm). High cover to cinnamon fern and other herbs such as creeping snowberry and three seeded sedge is common. The shrub layer is less developed compared to WC2. An abundance of sphagnum moss species are present.

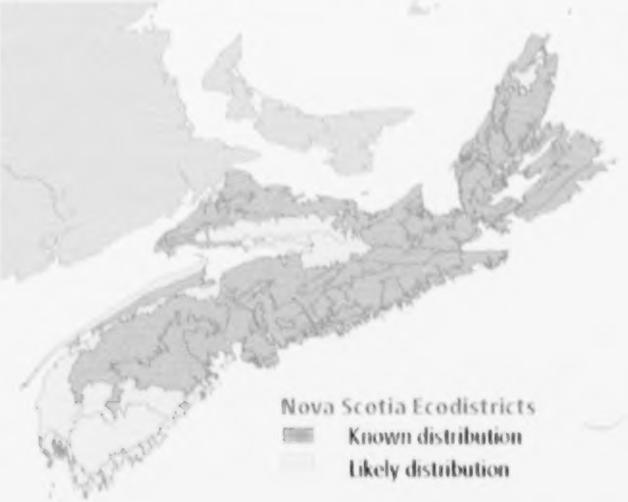
Cinnamon fern

Site Characteristics

Slope Position:	Level^{8} Other^{2}
Surface Stoniness:	(Non – Slightly)^{8} (Moderately)^{1} (Very – Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	10 - 469m
Slope Gradient:	Level^{8} Gentle^{2}
Aspect:	North^{1} None^{8} Other^{1}
Exposure:	Moderate^{7} Exposed^{1} Mod. exposed^{1} Other^{1}
Microtopography:	Level^{7} Slightly^{2} Other^{1}
Drainage:	Poor^{5} Very poor^{4} Imperfect^{1}

Soil Characteristics

Soil Type:	ST14^{4} ST4^{3} ST7^{2} ST6^{1}
Parent Material:	Glacial till^{5} Organic^{4} Other^{1}
Rooting Depth (cm):	(<30)^{7} (30-45)^{2} nd^{1}
Duff Thickness (cm):	(11-20)^{3} (21-40)^{3} (>40)^{3} nd^{1}



*Black Lake,
Cumberland County*

WC2

Black spruce / Lambkill – Labrador tea / Sphagnum

Picea mariana / Kalmia angustifolia – Ledum groenlandicum / Sphagnum spp

WC 2a

Huckleberry – Inkberry variant

Gaylussacia baccata – Ilex glabra

n=39

Concept: This nutrient poor to very poor coniferous forest is characterized by black spruce canopy dominance and by high shrub and sphagnum moss cover. It is found on poorly drained mineral or organic deposits, persisting as an edaphic climax. The ecosystem is the most acidic, wet black spruce forest in Nova Scotia. Stands with coastal plain species like inkberry and/or moderate to high levels of huckleberry distinguish the variant WC2a. WC2 is similar to WC1 (Black spruce / Cinnamon fern / Sphagnum), another wet black spruce forest with higher herbaceous cover and slightly less acidic soils.

Vegetation: Crown closure is low to moderate, increasing light availability to lower strata and promoting shrub abundance. The overstory is dominated by black spruce and/or hybrid black spruce-red spruce. In younger, more exposed, or extremely wet stands, the canopy may be formed by stunted trees in the tall shrub layer. The woody understory is thick with lambkill and scattered Labrador tea, rhodora and false holly. Creeping snowberry and goldthread characterize the sparse herbaceous layer. The dense bryophyte carpet is dominated by sphagnum moss. Ladies' tresses and flat topped sphagnum are common. Red fat leaved sphagnum is much more frequent than in other coniferous wet forests of the province.

Environmental Setting: This ecosystem usually occurs on poorly drained flats, underlain by coarse textured glacial tills or peat. Some stands are found on imperfectly drained soil, but this is very uncommon. Ground and surface water flow is minimal and/or low in nutrients. Rooting potential is limited by compacted and/or saturated soils. Sites are moderately exposed, with very little microtopography. Sloped occurrences are usually found on the cooler aspects. Most stands are found in the Northumberland – Bras d'Or and Valley – Central Lowland ecoregions, but some extend into upland and even highland areas. Occurrences of WC2a are largely limited to the Western ecoregion. WC2 is widespread and abundant across the Maritime Provinces, but is particularly common in lowland regions.

Successional Dynamics: This forest is a type of edaphic climax, meaning it is maintained by limiting site conditions including soil saturation and shallow rooting potential. Tree windthrow and uprooting are common mechanisms of renewal, but fire and timber harvest can sometimes play a role. Most stands are mid-successional but this ecosystem can be expressed at a variety of successional stages. WC2 does not shift to other vegetation types after major disturbance, but does change in development stage. Uneven age class distributions are typically developed between these disturbances. Vegetative layering is the dominant form of black spruce regeneration.

Ecological Features

Crown closure in this small patch ecosystem is low to moderate, while the understory is thick with shrubs and regenerating trees. Plant species richness and site productivity is reduced, limiting habitat diversity and rare species potential. However, WC2a, the huckleberry-inkberry variant, occasionally supports somewhat rare Atlantic Coastal Plain plants like skunk cabbage, high-bush blueberry and Elliot's goldenrod. Similar to other wet forests, this wet forest can regulate water flow, provide filtration, and recharge groundwater. Reduced productivity and the presence of allelopathic plants (those that produce biochemicals that affect nearby plants) like lambkill can negatively influence black spruce regeneration and growth, resulting in lower canopy cover. These ecosystems provide thermal cover for moose and winter cover for deer. They can support numerous bird species, but specific associates are undocumented. These forests can sustain old growth conditions which are easily overlooked due to the generally small trees. It can support prominent levels of dwarf mistletoe and associated witches broom.

Characteristic Plants	WC2 Freq. (%)	WC2 Cover (%)	WC2a Freq. (%)	WC2a Cover (%)
Black spruce	94	41.7	71	28.0
Tamarack	38	3.2	57	4.5
Balsam fir	25	5.8		
Red maple	19	5.2	43	13.3
White pine	6	1.5	43	3.7
Hybrid spruce	3	65.0	14	40.0
Tree Layer (Mean % Cover)		**45**		**36**
Lambkill	100	13.6	100	10.5
Black spruce	97	15.0	100	10.1
False holly	94	3.4	100	14.8
Wild raisin	88	2.0	100	2.3
Labrador tea	81	5.9	86	3.8
Red maple	78	1.8	100	5.9
Velvet leaf blueberry	72	3.7	57	3.0
Balsam fir	66	3.0	57	1.8
Rhodora	53	6.6	29	10.1
Lowbush blueberry	44	3.7	43	3.0
Serviceberry	38	0.3	43	0.5
Tamarack	25	0.2	43	0.8
Mountain ash	22	0.1	14	0.1
Speckled alder	19	2.2	14	0.1
Huckleberry	19	0.9	71	34.8
Winterberry	13	0.6	29	7.0
Inkberry			43	10.0
Shrub Layer (Mean % Cover)		**51**		**81**
Bunchberry	94	7.9	100	6.6
Creeping snowberry	75	2.8	71	12.9
Goldthread	75	2.0	100	1.0
Cinnamon fern	56	2.9	57	3.3
Three seeded sedge	50	4.3	43	15.3
Bracken	47	6.5	43	8.3
Pink lady's slipper	34	0.1	29	0.1
Starflower	31	0.3	57	0.1
Wild lily of the valley	25	0.8	43	0.1
Teaberry	22	0.2	29	0.1
Mayflower	19	0.3	43	0.1
Sarsaparilla	13	0.8	43	0.2
Trailing blackberry	13	0.2	43	0.7
Painted trillium	13	0.1	29	0.3
Round leaved sundew	6	0.2	43	0.1
Partridge berry	6	0.1	43	0.2
Pitcher plant	3	1.0	43	2.0
Dwarf raspberry	3	0.5	29	2.5
Button sedge			29	1.5
Herb Layer (Mean % Cover)		**24**		**34**
Schreber's moss	94	37.7	86	24.3
Stair step moss	72	3.8		
Ladies' tresses	69	33.6	71	17.4
Wavy dicranum	59	2.0	29	10.5
Grey reindeer lichen	56	1.3	86	0.1
Bazzania	50	3.1	57	0.3
Flat topped sphagnum	44	13.7	43	16.3
Broom moss	41	2.5	29	0.5
Red fat leaved sphagnum	25	27.7	43	11.0
Common green sphagnum	22	9.5		
Pale fat leaved sphagnum	16	12.4	29	6.5
Brown fat-leaved sphagnum	6	6.5	29	56.5
Bryo-Lichen Layer (Mean % Cover)		**94**		**71**

Distinguishing Features

Black spruce dominates this poorly drained softwood forest with a high shrub cover. The variant WC2a will have coastal plain species like inkberry and/or moderate to high levels of huckleberry. The herb layer is less developed than in WC1.

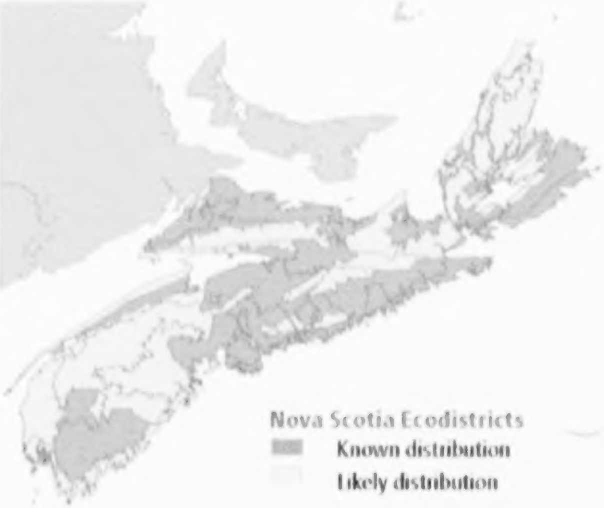
Labrador tea

Site Characteristics

Slope Position:	Level^{8} Lower^{1} Other^{1}
Surface Stoniness:	(Non - Slightly)^{8} (Moderately)^{1} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	9 - 182m
Slope Gradient:	Level^{9} Gentle^{1}
Aspect:	East^{1} None^{8} Other^{1}
Exposure:	Moderate^{8} Mod. sheltered^{1} Other^{1}
Microtopography:	Level^{7} Slightly^{2} Moderately^{1}
Drainage:	Poor^{5} Very poor^{4} Imperfect^{1}

Soil Characteristics

Soil Type:	ST4^{4} ST14^{3} ST7^{2} Other^{1}
Parent Material:	Glacial till^{5} Organic^{3} Glaciofluvial^{1} Other^{1}
Rooting Depth (cm):	(<30)^{8} (30-45)^{1} nd^{1}
Duff Thickness (cm):	(6-10)^{1} (11-20)^{1} (21-40)^{1} (>40)^{7} nd^{1}



Thomson Station,
Cumberland County

WC3

Jack pine – Black spruce / Rhodora / Sphagnum

Pinus banksiana – Picea mariana / Rhododendron canadense / Sphagnum spp.

WC3a

Black spruce variant

Picea mariana

n=9

Concept: The Jack pine – Black spruce / Rhodora / Sphagnum is the wettest jack pine forest in Nova Scotia. Most occurrences are on poorly to very poorly drained soil, derived from acidic glacial till or, less commonly, organic deposits. The overstory is dominated by jack pine, or co-dominated by jack pine and black spruce; the latter condition described by WC3a, the black spruce variant.

Vegetation: Canopy layers are dominated by jack pine (or co-dominated by jack pine and black spruce). Tamarack and/or balsam fir are infrequent associates. Limiting site conditions and the prevalence of inherently small crowned conifers reduces canopy closure and promotes shrub abundance. Rhodora is present and usually dominant in most stands, with admixtures of lambkill and/or Labrador tea. Huckleberry is less common but abundant in some occurrences. Jack pine regeneration is low or absent from the understory. Herbaceous cover is reduced, largely comprised of scattered teaberry, mayflower and other common upland forest species. Bracken fern, mayflower, hair-cap moss and wavy dicranum are more frequent than in any other wet coniferous forest in Nova Scotia. Sphagnum moss, particularly ladies' tresses, and small patches of upland species are typical in the well-developed bryophyte layer.

Environmental Setting: The Jack pine – Black spruce / Rhodora / Sphagnum forest usually occurs on poorly drained mineral soil, but may be found on peat deposits. Mineral soils are acidic loams with reduced rooting potential. Some stands are on imperfectly drained sites but most are poorly or very poorly drained; organic soils are found on the wettest sites. This low elevation ecosystem is usually on moderately exposed flats but may be found in lower topographic positions of gentle slopes or in shallow depressions with very little microtopography. Sloped occurrences are usually found on cooler aspects. This uncommon forest is largely limited to northern and central parts of the mainland and parts of Cape Breton. WC3 extends into lowlands of eastern New Brunswick, where it is relatively common, and onto Prince Edward Island where it is extremely rare.

Successional Dynamics: This early to mid-successional forest usually originates with fire, promoting jack pine regeneration. Extreme weather events can dry litter, surface soil horizons, and the somewhat flammable ericaceous plant layer to allow these normally wet stands to burn. Such conditions are uncommon however and many stands form through seed-in from adjacent uplands. The Jack pine – Black spruce / Rhodora / Sphagnum forest will succeed to WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum).

Ecological Features

An open canopy of narrow-crowned conifers characterizes this very uncommon small patch ecosystem. The woody understory is dense with ericaceous shrubs and black spruce. Productivity is low, few rare plant species are expected, and old growth potential is low. This wet forest is often a transition between open wetlands and upland coniferous forest, providing important hydrologic and biogeochemical functions. Reduced productivity and the presence of allelopathic plants (those that produce biochemicals that affect nearby plants) like lambkill can negatively influence black spruce regeneration and growth, resulting in lower canopy cover. Occurrences may provide locally if not provincially important habitat for various invertebrates, birds, amphibians, small mammals, reptiles and lichens. By virtue of its rarity, restricted Canadian range and fire dependency, this ecosystem may present unique conservation challenges.

Characteristic Plants	WC3		WC3a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Jack pine	100	27.0	100	18.5
Black spruce	100	5.2	100	34.8
Tamarack	40	3.5		
Balsam fir	20	3.0		
Red maple	20	0.1	25	2.0
Red pine	20	0.1	25	0.1
White pine	20	0.1		
Grey birch			25	0.1
White birch			25	0.1
Tree Layer (Mean % Cover)		**34**		**54**
Rhodora	100	28.6	75	34.3
Lambkill	100	19.6	100	18.3
Black spruce	100	9.4	100	2.5
Red maple	100	4.2	100	1.1
Serviceberry	100	0.7	25	0.2
Labrador tea	80	8.8	100	5.5
Velvet leaf blueberry	80	6.4	50	1.0
Lowbush blueberry	80	3.5	75	2.0
Wild raisin	80	1.8	75	0.1
Huckleberry	60	26.7	50	5.1
False holly	60	7.3	100	4.9
Ground juniper	40	2.0		
Tamarack	40	2.0	25	0.1
Balsam fir	40	1.5		
Willows	40	1.5		
Jack pine	40	1.0		
Chokeberries	40	0.3	50	0.1
Downy alder	40	0.2		
Leather leaf	20	3.0	25	0.1
Black chokeberry	20	0.5	25	1.0
Shrub Layer (Mean % Cover)		**100**		**62**
Bracken	100	7.4	50	10.0
Teaberry	80	13.5	75	3.7
Bunchberry	80	5.8	75	3.5
Starflower	60	0.4	25	0.1
Mayflower	60	0.1	75	0.2
Pink lady's slipper	60	0.1	75	0.4
Wild lily of the valley	40	0.6	25	0.5
Goldthread	40	0.2	75	0.8
Three seeded sedge			75	1.4
Cinnamon fern			50	12.5
Creeping snowberry			50	3.1
Ground pine			50	0.1
Indian pipe			50	0.1
Herb Layer (Mean % Cover)		**24**		**21**
Schreber's moss	100	62.6	100	35.0
Ladies' tresses	80	12.5	100	31.3
Wavy dicranum	80	3.5	100	1.8
Flat topped sphagnum	40	18.5	25	43.0
Grey reindeer lichen	40	8.5	50	0.5
Russ's sphagnum	20	4.0		
Bazzania	20	3.0	25	5.0
Stair step moss	20	2.0	25	0.1
Pale fat leaved sphagnum	20	0.1	50	22.5
Common green sphagnum			25	20.0
Broom moss			25	5.0
Bryo-Lichen Layer (Mean % Cover)		**90**		**98**

Distinguishing Features

Jack pine is diagnostic of this poorly drained softwood forest. The woody shrub layer is well developed with rhodora, lambkill and Labrador tea. Sphagnum mosses dominate the groundcover.

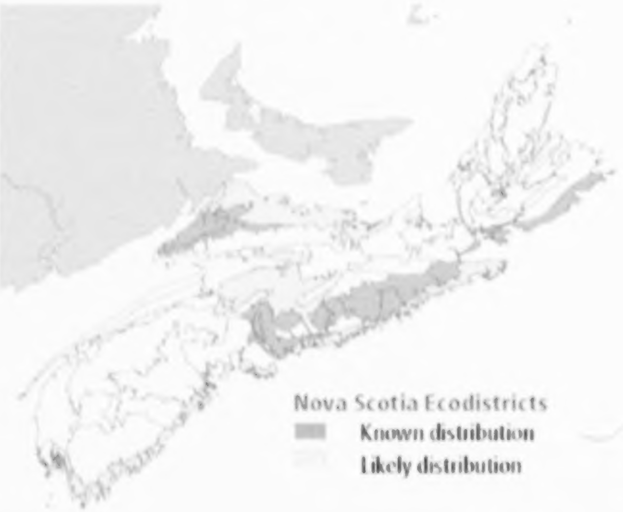
Rhodora

Site Characteristics

Slope Position:	Level^{7} Lower^{2} Upper^{1}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	12 - 110m
Slope Gradient:	Level^{7} Gentle^{3}
Aspect:	East^{1} South^{3} Other^{6}
Exposure:	Moderate^{8} Mod. exposed^{2}
Microtopography:	Level^{9} Slightly^{1}
Drainage:	Poor^{6} Very poor^{2} Imperfect^{2}

Soil Characteristics

Soil Type:	ST4^{6} ST6^{2} ST7^{2}
Parent Material:	Glacial till^{9} Glaciofluvial^{1}
Rooting Depth (cm):	(<30)^{9} (30-45)^{1}
Duff Thickness (cm):	(6-10)^{1} (11-20)^{8} (21-40)^{1}



Lapland,
Lunenburg County

WC4

Red pine – Black spruce / Huckleberry – Rhodora / Sphagnum

Pinus resinosa – Picea mariana / Gaylussacia baccata – Rhododendron canadense / Sphagnum spp.

n=3

Concept: This uncommon wet forest is characterized by red pine canopy dominance, a well-developed shrub layer, and prominent sphagnum moss cover. The early to mid-successional ecosystem is the wettest red pine forest found in Nova Scotia. Most occurrences are initiated by (and may be maintained through) fire, but windthrow can also expose mineral soil and promote red pine recruitment.

Vegetation: Canopy layers are dominated by red pine or co-dominated by red pine and either black spruce or white pine. Crown closure is typically low but increases on less saturated soil. The understory is well developed, with moderate to high shrub and bryophyte cover. Acid tolerant shrubs including huckleberry, rhodora, low bush blueberry, wild raisin and Labrador tea, among others, are frequent. Red pine recruitment is low to absent beneath the canopy. The herb layer is reduced except in stands with prominent bracken. Bryophyte cover is well developed but species poor. Ladies' tresses is the only prominent sphagnum species.

Environmental Setting: The Red pine - Black spruce / Huckleberry - Rhodora / Sphagnum forest occurs on moderately exposed flats and gentle slopes. Soils are poorly drained glacial tills with low rooting potential and usually high organic layer accumulation. It is largely known from the Western ecoregion on moderately exposed flats and gentle slopes; microtopography is slight to moderate and aspect is variable. WC4 is somewhat rare in New Brunswick and absent from Prince Edward Island.

Successional Dynamics: This early to mid successional forest originates with fire or windthrow, both of which may promote red pine regeneration. Tree uprooting resulting from windthrow exposes mineral soil required for red pine seed germination. Red pine's presence decreases between disturbance events. This favours black spruce, a longer-lived species with the flexibility to regenerate through either seeding or layering. In the absence of fire, the ecosystem will eventually succeed to WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum).

Ecological Features

The small patch Red pine – Black spruce / Huckleberry – Rhodora / Sphagnum is an uncommon ecosystem characterized by low canopy closure but high shrub and bryophyte cover. Soils are acidic with low surface and ground water flow, reducing microhabitat variability, productivity and species richness. Reduced productivity and the presence of allelopathic plants (those that produce biochemicals that affect other plants) like lambkill can negatively influence black spruce regeneration and growth, resulting in lower canopy cover. These forests can have an older cohort of fire-scarred red pine "parent trees", frequently with cavities and hollow trunks. Rare plants are not documented from the ecosystem and old growth potential is low. This wet forest is rare in Nova Scotia, and with its fire dependency, may present additional conservation challenges. WC4 may provide locally if not provincially unique habitat for particular wildlife, but specific associates are undocumented.

Characteristic Plants	WC4	
	Freq. (%)	Cover (%)
Red pine	100	19.0
Black spruce	67	14.0
Red maple	67	6.0
White pine	33	20.0
Balsam fir	33	3.0
Tree Layer (Mean % Cover)		**40**
Lambkill	100	27.7
Lowbush blueberry	100	5.5
Black spruce	100	2.4
Wild raisin	100	2.2
Serviceberry	100	0.1
Huckleberry	67	20.0
Rhodora	67	16.0
Grey birch	67	6.5
Red maple	67	2.8
False holly	67	2.5
Labrador tea	67	2.0
Tamarack	67	0.3
Speckled alder	67	0.1
White pine	67	0.1
Leather-leaf	33	80.0
Velvet-leaf blueberry	33	15.0
Pale laurel	33	2.0
Balsam fir	33	1.0
Broom crowberry	33	0.5
Red chokeberry	33	0.5
Ground juniper	33	0.3
Chokeberries	33	0.1
Trailing blackberry	33	0.1
Red pine	33	0.1
Shrub Layer (Mean % Cover)		**85**
Bracken	67	42.5
Bunchberry	67	20.0
Teaberry	67	13.0
Large cranberry	33	25.0
Creeping snowberry	33	5.0
Dwarf raspberry	33	2.0
Pitcher plant	33	1.0
Rushes	33	1.0
Mayflower	33	0.5
False violet	33	0.2
Partridge-berry	33	0.2
Black crowberry	33	0.1
Bog-goldenrod	33	0.1
Cinnamon fern	33	0.1
Goldthread	33	0.1
Indian pipe	33	0.1
Pink lady's slipper	33	0.1
Rose pogonia	33	0.1
Rough aster	33	0.1
Herb Layer (Mean % Cover)		**62**
Ladies' tresses	100	79.3
Schreber's moss	67	3.5
Grey reindeer lichen	67	1.8
Brown fat-leaved sphagnum	33	5.0
Russ's sphagnum	33	5.0
Wavy dicranum	33	0.5
Star-tipped reindeer lichen	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**85**

Distinguishing Features

Red pine is diagnostic of this poorly drained softwood forest with a high shrub cover, dominated by lambkill, huckleberry and rhodora. Bracken, bunchberry and teaberry are often abundant.

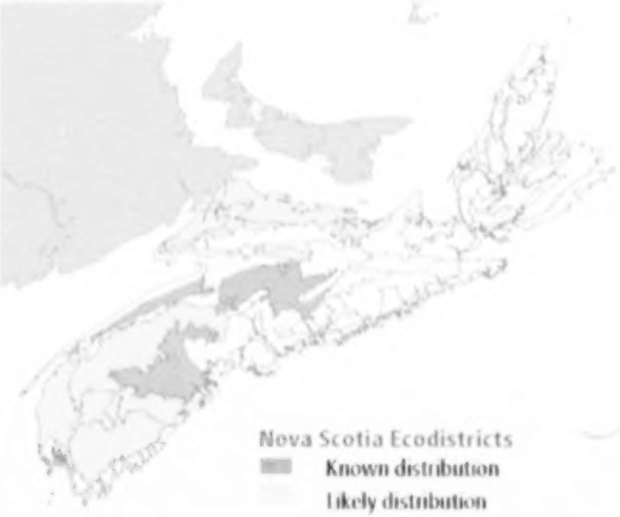
Huckleberry

Site Characteristics

Slope Position:	Level^{7} Middle^{3}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non rocky)^{7} (Slightly - Moderately)^{3}
Elevation Range:	28 - 101m
Slope Gradient:	Level^{10}
Aspect:	West^{3} None^{7}
Exposure:	Moderate^{10}
Microtopography:	Level^{7} Moderately^{3}
Drainage:	Poor^{10}

Soil Characteristics

Soil Type:	ST7^{7} ST14^{3}
Parent Material:	Glacial till^{7} Glaciofluvial^{3}
Rooting Depth (cm):	(<30)^{10}
Duff Thickness (cm):	(6-10)^{3}(11-20)^{3}(21-40)^{3}



Castlereagh, Colchester County

WC5

Red spruce – Balsam fir/ Cinnamon fern / Sphagnum

Picea rubens – Abies balsamea / Osmunda cinnamomea / Sphagnum spp.

n=19

Concept: This mature coniferous ecosystem is one of two wet red spruce forests found in Nova Scotia. WD8 is a comparable Vegetation Type (VT) with low to moderate levels of both red spruce and red maple. Red spruce – Balsam fir/ Cinnamon fern / Sphagnum forest is found on soils with reduced rooting potential and relatively low nutrient availability, but sites are generally more productive than those supporting wet black spruce forests (e.g. WC1 and WC2). It is a low-elevation ecosystem characterized by red spruce dominance and high sphagnum moss cover.

Vegetation: The evergreen canopy is dominated by red spruce with lesser but frequent balsam fir. Few other tree species are frequent in the canopy, but it is well developed with moderate to high crown closure. Woody shrub and herbaceous cover is low to moderate. Forest plants common to wet forest (e.g. cinnamon fern) are present, but few species are prominent. Sphagnum mosses largely dominate the dense bryophyte layer. Similar to other moderately productive, wet coniferous VTs (i.e. WC6, WC7 and WC8), common green sphagnum is characteristic.

Environmental Setting: The Red spruce – Balsam fir/ Cinnamon fern / Sphagnum forest is found on lowland plains and gently rolling uplands. It is common on moderately exposed flats, depressions and in lower and toe positions of gentle slopes; aspect of the slope is variable. Soils are usually derived from fine to moderately textured glacial tills with low to moderate nutrient availability. Peat accumulation can be high, and while some stands grow on organic soil, most are on gleyed or heavily mottled mineral deposits. Sites are slightly to moderately mounded and generally have more microtopography than other wet coniferous forests in Nova Scotia. The VT is found throughout Nova Scotia, but is more common in the Eastern and Western ecoregions of the mainland. WC5 is relatively widespread and common in New Brunswick but rare on Prince Edward Island.

Successional Dynamics: This mid to late successional ecosystem is a type of edaphic climax, renewed by tree senescence, windthrow and other small to intermediate scaled disturbance agents. Between such disturbances, natural senescence can shape age class, favoring uneven stand structures. Windthrow and harvesting are the main stand-level disturbance agents. The mature forest may succeed from WC6 (Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum), WD6 (Red maple – Balsam fir / Wood aster / Sphagnum) or WD8 (Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum). Depending on disturbance history and nearby stand composition, WC5 may transition to WC8 (Hemlock / Cinnamon fern – Sensitive fern / Sphagnum).

Ecological Features

This relatively common ecosystem occurs as a small patch in larger upland matrix forests, at the edge of open wetlands, or adjacent to other wet forest types. It is a temperate wet forest, characterized by high canopy development, low woody understory cover and high bryophyte cover; herbaceous development is variable. Sites are somewhat acidic with only moderate microhabitat variability and species richness. Wet red spruce forests are generally found on more productive sites than similar wet black spruce forests, but few rare plants are documented. Old growth potential is low to moderate but may be higher in areas less prone to patch and stand replacing disturbance. This well developed wet forest may provide cover for moose and deer and locally important habitat features for numerous other forest wildlife. Similar to other wet forests, WC5 can regulate water flow, provide filtration, and recharge groundwater that are distinct from upland ecosystems.

Characteristic Plants

Characteristic Plants	WC5 Freq. (%)	WC5 Cover (%)
Red spruce	100	49.0
Balsam fir	84	19.1
Red maple	79	5.3
Black spruce	37	18.1
White birch	37	2.3
Yellow birch	21	2.5
Hemlock	16	5.0
White pine	16	2.0
Trembling aspen	11	6.0
Tree Layer (Mean % Cover)		**79**
Balsam fir	95	5.2
Red spruce	84	3.8
Red maple	74	0.2
Lambkill	53	0.7
False holly	53	0.1
Velvet-leaf blueberry	42	0.3
Wild raisin	37	0.1
Lowbush blueberry	32	0.3
Yellow birch	26	0.2
Striped maple	21	0.2
White pine	21	0.1
Shrub Layer (Mean % Cover)		**10**
Goldthread	100	1.9
Cinnamon fern	89	5.8
Bunchberry	89	0.6
Starflower	63	0.1
New York fern	53	4.5
Wood-sorrel	53	0.9
Bluebead lily	53	0.2
Wild lily-of-the-valley	47	0.2
Three-seeded sedge	42	0.7
Twinflower	42	0.7
Creeping snowberry	42	0.2
Wood aster	37	0.1
Evergreen wood fern	32	2.6
Bracken	32	2.2
Painted trillium	32	0.1
Sarsaparilla	26	0.2
Partridge-berry	21	0.6
Indian pipe	21	0.1
Herb Layer (Mean % Cover)		**14**
Bazzania	100	14.4
Schreber's moss	95	22.8
Stair-step moss	95	17.0
Common green sphagnum	68	22.1
Hypnum moss	63	1.5
Ladies' tresses	58	13.0
Pale fat-leaved sphagnum	47	1.1
Broom moss	47	1.0
Wavy dicranum	37	1.8
Hair-cap moss	37	0.2
Grey reindeer lichen	26	0.1
Bryo-Lichen Layer (Mean % Cover)		**87**

Distinguishing Features

Red spruce dominates this poorly drained softwood forest with some balsam fir. Sphagnum mosses, particularly common green and ladies' tresses dominate the groundcover. Both the shrub and herb layer are not well developed.

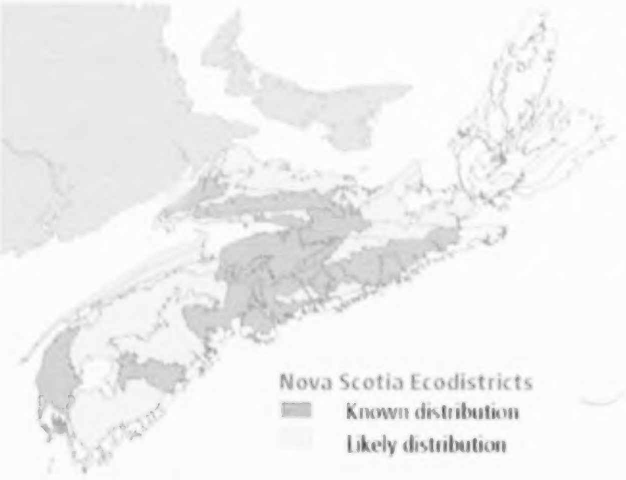
Brittle stem sphagnum

Site Characteristics

Slope Position:	Level[6] Toe[2] Lower[1] Depression[1]
Surface Stoniness:	(Non - Slightly)[8] (Moderately)[1] (Very - Excessively)[1]
Bedrock Outcrop:	(Non-rocky)[10]
Elevation Range:	13 - 287m
Slope Gradient:	Level[9] Gentle[1]
Aspect:	North[1] East[2] South[1] West[1] None[5]
Exposure:	Moderate[5] Mod. exposed[2] Mod. sheltered[2] Sheltered[1]
Microtopography:	Slightly[5] Level[2] Moderately[2] Strongly[1]
Drainage:	Poor[4] Very poor[5] Imperfect[1]

Soil Characteristics

Soil Type:	ST4[8] ST7[1] ST14[1]
Parent Material:	Glacial till[7] Glaciofluvial[1] Lacustrine[1] Organic[1]
Rooting Depth (cm):	(<30)[8] (30-45)[1] nd[1]
Duff Thickness (cm):	(6-10)[1] (11-20)[4] (21-40)[4] nd[1]



Nova Scotia Ecodistricts

▨ Known distribution

☐ Likely distribution

Mount Thom,
Pictou County

WC6

Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum

Abies balsamea / Osmunda cinnamomea –
Carex trisperma / Sphagnum spp.

n=18

Concept: This coniferous forest is characterized by balsam fir canopy dominance and high sphagnum moss cover. The early to mid-successional ecosystem is generally associated with wet soils, but may occur on imperfectly drained sites. Low to moderate nutrient availability is typical but this Vegetation Type (VT) is usually on richer sites than wet black spruce – pine forests (WC1 – WC4).

Vegetation: Canopy layers are usually well developed, but some stands are open with stunted and/or more widely-spaced trees. The canopy is heavily dominated by balsam fir. Other important co-dominants may include white spruce, black spruce and/or red maple. The shrub layer is variably developed but usually supports low to moderate cover. Few woody shrubs are frequent. False holly, wild raisin and/or lambkill may be sparsely scattered but they are not especially prominent. Herbaceous cover is moderate, largely comprised of wet site species (e.g. cinnamon fern, three seeded sedge) and common upland coniferous forest plants. Sphagnum species dominate the dense bryophyte layer. Common green and ladies' tresses sphagnum mosses are typical.

Environmental Setting: The Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum forest occurs on poorly drained flats, in shallow depressions and on gentle to moderate slopes. Most sites are at least moderately exposed and have very little microtopography. Cooler slopes are favoured, but aspect is somewhat variable. Soils are usually derived from glacial tills, but organic deposits also provide suitable habitat. Low to moderate nutrient availability is typical. The VT is primarily found scattered throughout central and eastern Nova Scotia. WC6 is widespread throughout the Maritime Provinces.

Successional Dynamics: In cooler highland and coastal ecoregions, the forest may persist as a type of edaphic climax but elsewhere, it will succeed to WC5 (Red spruce – Balsam fir/ Cinnamon fern / Sphagnum) or WC8 (Hemlock / Cinnamon fern – Sensitive fern / Sphagnum). Depending on disturbance regime and the local ecological context, WC6 could also transition to WD2 (Red maple / Cinnamon fern / Sphagnum), WD6 (Red maple – Balsam fir / Wood aster / Sphagnum), WD8 (Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum) or even CE1 (Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum). Common disturbance agents are tree mortality caused by windthrow, timber harvest and spruce budworm defoliation.

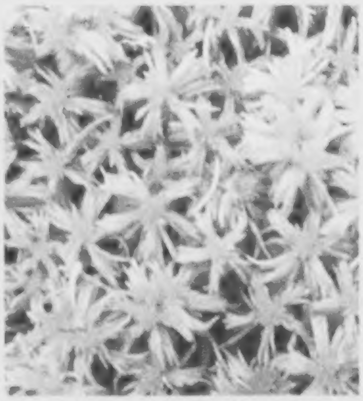
Ecological Features

The Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum forest occurs as a small patch in larger upland conifer or mixedwood forests, at the edge of open wetlands, or adjacent to other types of wet forest. The ecosystem is characterized by moderate to high canopy development, usually sparse woody understory cover but generally dense herbaceous and bryophyte cover. Old growth potential is low but may be higher in cooler or sheltered areas, less prone to patch and stand-replacing disturbance. In cooler areas, this ecosystem may persist as a type of edaphic climax, representing an important component of landscape structure, but successional dynamics are not completely understood. Similar to all wet forests, this ecosystem supports valuable habitat, distinct ecological features and unique biogeochemical functions. Documented rare plant associates include: creeping rattlesnake plantain, showy lady's slipper, meadow horsetail and foamflower.

Characteristic Plants	WC6 Freq. (%)	WC6 Cover (%)
Balsam fir	100	42.3
Black spruce	67	12.3
Red maple	61	4.1
White spruce	33	11.7
White birch	28	5.2
White pine	17	2.0
White ash	11	3.0
Hemlock	11	1.5
Red spruce	11	1.5
Tamarack	11	1.5
Tree Layer (Mean % Cover)		**60**
Balsam fir	83	12.8
False holly	61	3.8
Red maple	61	1.0
Black spruce	50	3.9
Wild raisin	50	0.3
Lambkill	39	0.5
White birch	33	3.4
Velvet-leaf blueberry	33	2.8
Serviceberry	33	0.1
Fly-honeysuckle	28	0.6
Yellow birch	28	0.3
Mountain-ash	28	0.2
Lowbush blueberry	22	0.1
Striped maple	22	0.1
Shrub Layer (Mean % Cover)		**20**
Cinnamon fern	89	26.4
Bunchberry	89	3.3
Starflower	83	0.4
Sarsaparilla	78	4.0
Goldthread	78	3.7
Twinflower	72	4.4
Wood-sorrel	67	3.3
Three seeded sedge	67	3.2
Creeping snowberry	61	6.8
Wild lily-of-the-valley	44	1.0
New York fern	33	14.2
Bluebead lily	33	4.6
Dwarf raspberry	33	1.4
Evergreen wood fern	33	1.1
Crested wood fern	33	0.2
Lady fern	22	0.4
Violets	22	0.3
Teaberry	22	0.2
Indian pipe	22	0.1
Rough goldenrod	22	0.1
Wood aster	22	0.1
Herb Layer (Mean % Cover)		**60**
Schreber's moss	94	10.0
Stair-step moss	89	18.5
Bazzania	83	2.8
Common green sphagnum	61	39.2
Ladies' tresses	44	6.8
Broom moss	44	1.8
Plume moss	39	0.8
Pale fat-leaved sphagnum	28	34.8
Wavy dicranum	28	0.7
Flat-topped sphagnum	22	24.9
Bryo-Lichen Layer (Mean % Cover)		**92**

Distinguishing Features

This is a poorly drained softwood forest dominated by balsam fir with occasional spruces and red maple. Cinnamon fern and three seeded sedge are common herbs, while sphagnum mosses dominate the groundcover.



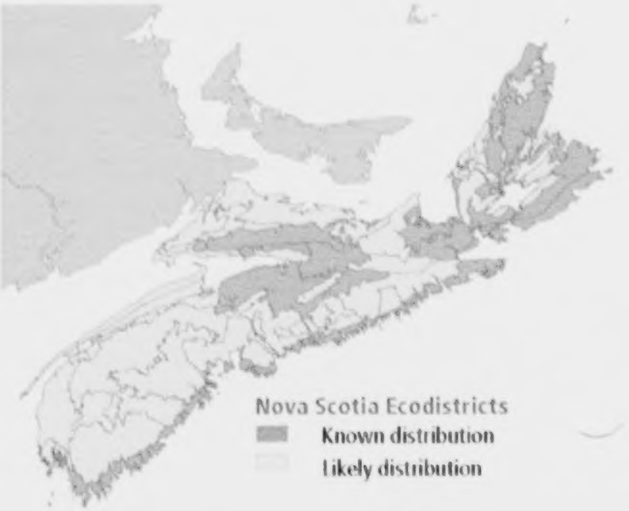
Common green sphagnum

Site Characteristics

Slope Position:	Level^{7} Middle^{2} Lower^{1}
Surface Stoniness:	(Non - Slightly)^{8} (Moderately)^{1} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	6 - 445m
Slope Gradient:	Level^{7} Gentle^{3}
Aspect:	North^{2} South^{2} None^{6}
Exposure:	Moderate^{4} Exposed^{3} Mod. exposed^{2} Other^{1}
Microtopography:	Level^{6} Slightly^{3} nd^{1}
Drainage:	Poor^{6} Very poor^{3} Imperfect^{1}

Soil Characteristics

Soil Type:	ST4^{3} ST14^{3} ST3^{1} ST6^{1} ST7^{1} ST13^{1}
Parent Material:	Glacial till^{6} Organic^{3} Lacustrine^{1}
Rooting Depth (cm):	(<30)^{6} (30-45)^{2} (>45)^{1} nd^{1}
Duff Thickness (cm):	(6-10)^{1} (11-20)^{2} (21-40)^{2} (>40)^{2} nd^{3}



Otter Brook,
Colchester County

WC7

Tamarack – Black spruce / Lambkill / Sphagnum

Larix laricina – Picea mariana /
Kalmia angustifolia / Sphagnum spp.

WC7a

Huckleberry – Inkberry variant

Gaylussacia baccata – Ilex glabra

n=17

Concept: This wet coniferous forest is characterized by tamarack canopy dominance or co-dominance and high sphagnum cover. It is the only wet tamarack forest ecosystem classified from Nova Scotia. Stands with coastal plain species like inkberry and/or moderate to high levels of huckleberry distinguish the inkberry variant WC7a; most of these occur in the Western ecoregion. WC7 is common on poorly drained flats and depressions, with low to moderate nutrient availability.

Vegetation: Canopy layers are usually well developed but trees may be widely spaced and restricted to the tall shrub layer. Some stands have enough red maple to support mixedwood canopy structures. Prominent levels of larch characterize this typically coniferous ecosystem. Many stands are co-dominated by black spruce, while occurrences in western Nova Scotia may support scattered white pine. The understory is well developed but herb and shrub cover is variable. Generally, stands with high shrub cover support lower herbaceous cover and vice versa. Characteristic woody shrub species include lambkill and wild raisin. Few herbs are frequent, but three seeded sedge is often present. The dense bryophyte layer is largely dominated by pale fat-leaved sphagnum and flat topped sphagnum.

Environmental Setting: The Tamarack - Black Spruce / Sphagnum forest usually occurs on poorly to very poorly drained flats or shallow depressions. Most stands are supported by organic soil, derived from sphagnum moss, but gleyed or strongly mottled till (and, less commonly, lake or river deposits) are similarly typical. This ecosystem is occasionally expressed on moist mineral soil. Most sites have little if any microtopography and variable exposure. Occurrences are often at low elevation, but may be found up to 400 meters, or higher. Tamarack - Black spruce / Sphagnum forest is widespread and relatively common throughout the Maritime Provinces, but the WC7a variant is limited to Nova Scotia.

Successional Dynamics: This is an early to mid-successional ecosystem that may persist as an edaphic climax. It can follow stand-replacing timber harvest or severe windthrow, or succeed open wetland vegetation types in peatland successional sequences. Between disturbance events, natural senescence can create uneven-aged stands and promote increased black spruce cover. Higher relative soil fertility usually limits this Vegetation Type from fully transitioning to WC1 (Black spruce / Cinnamon fern / Sphagnum) or WC2 (Black spruce / Lambkill - Labrador tea / Sphagnum). However, on poorer sites WC7a may succeed to WC2a.

Ecological Features

This usually wet coniferous forest is our only tamarack on organic soils, representing an important component of landscape structure. It is relatively common, often found fringing open wetlands or developing after black spruce peatlands are disturbed by harvesting. The usually open canopy allows abundant light to the forest floor, promoting understory development and supporting wildlife that requires dense cover, moist soils and/or small pools or tracts of standing water. These include numerous bird, amphibian and invertebrate wildlife species. Documented rare plants include showy lady's slipper, black ash and alder-leafed buckthorn. Atlantic Coastal Plain species (e.g. Virginia chain fern, inkberry, catbrier, skunk cabbage and Elliot's goldenrod, among others) may be present in WC7a. Canadian occurrences of WC7a are limited to Nova Scotia, representing a particularly important element of provincial biodiversity.

Characteristic Plants

	WC7		WC7a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Tamarack	93	41.1	100	31.5
Black spruce	80	20.3	100	21.5
Red maple	40	6.7	100	7.5
Balsam fir	20	6.0		
White pine	7	2.0	50	12.0
Tree Layer (Mean % Cover)		**59**		**67**
Black spruce	87	13.3	50	3.0
Red maple	73	4.6	50	2.0
Speckled alder	60	17.1		
Lambkill	60	2.9	50	0.1
Wild raisin	60	1.8	50	0.1
Balsam fir	60	1.4	100	0.5
Labrador tea	53	9.2	100	0.4
False holly	47	6.5	100	0.5
Tamarack	47	3.5		
Winterberry	40	4.9		
Meadow-sweet	40	3.4		
Velvet-leaf blueberry	40	0.9	50	0.5
Roses	40	0.7		
Leather-leaf	33	9.0		
Rhodora	33	5.2	50	0.5
Serviceberry	33	0.1		
Lowbush blueberry	27	0.1	50	0.1
Small cranberry	20	1.7		
Huckleberry	13	0.5	50	50.0
Inkberry			100	2.8
Shrub Layer (Mean % Cover)		**49**		**33**
Bunchberry	60	5.0	100	0.3
Cinnamon fern	53	7.4	100	6.0
Three seeded sedge	53	3.1	100	3.1
Three-leaved false Solomon's seal	53	2.7		
Blue flag	47	0.2		
Blue joint	40	1.5		
Goldthread	40	1.1	100	0.3
Creeping snowberry	33	1.7		
Violets	33	0.7		
Marsh fern	33	0.2		
Wild lily-of-the-valley	33	0.1		
Stiff sedge	27	42.6		
Crested wood fern	27	0.2		
Loosestrife	27	0.2		
Trailing blackberry	27	0.1	50	0.1
Dwarf raspberry	20	16.7		
Pitcher-plant	20	0.2	50	1.0
Starflower	20	0.2	100	0.1
Herb Layer (Mean % Cover)		**40**		**11**
Pale fat-leaved sphagnum	80	25.3	50	20.0
Schreber's moss	73	4.7	100	3.5
Flat-topped sphagnum	60	50.6	50	45.0
Bazzania	47	3.0	100	5.5
Stair-step moss	40	2.6		
Ladies' tresses	33	5.8	50	5.0
Red fat-leaved sphagnum	20	12.7		
Common green sphagnum	13	42.5	50	60.0
Hypnum moss	13	0.5	50	2.0
Brown fat-leaved sphagnum	7	1.0	50	40.0
Fine sphagnum	7	0.3	50	4.0
Bryo-Lichen Layer (Mean % Cover)		**79**		**98**

Distinguishing Features

Tamarack is diagnostic of this poorly drained softwood forest with variable levels of black spruce, red maple and speckled alder. The variant WC7a will have Coastal Plain species like inkberry and/or moderate to high levels of huckleberry. Sphagnum mosses are abundant with the three fat-leaved species common.

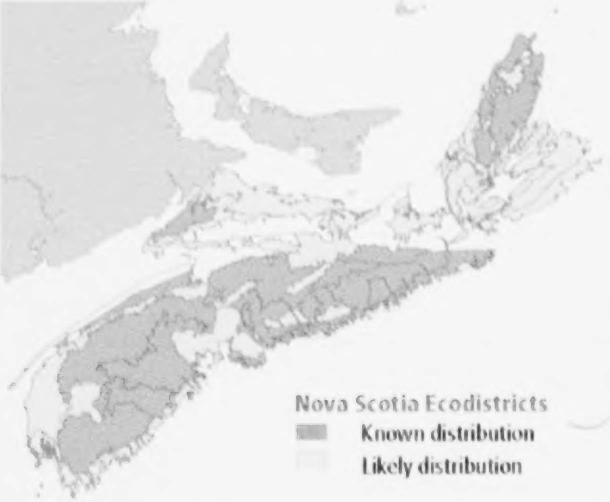
Inkberry

Site Characteristics

Slope Position:	Level^{8} Depression^{2}
Surface Stoniness:	(Non - Slightly)^{9} nd^{1}
Bedrock Outcrop:	(Non-rocky)^{9} nd^{1}
Elevation Range:	8 - 415m
Slope Gradient:	Level^{10}
Aspect:	None^{10}
Exposure:	Moderate^{6} Mod. sheltered^{2} Exposed^{1} Sheltered^{1}
Microtopography:	Level^{9} Other^{1}
Drainage:	Very poor^{6} Poor^{3} Imperfect^{1}

Soil Characteristics

Soil Type:	ST14^{6} ST4^{1} ST6^{1} ST7^{1} ST10^{1}
Parent Material:	Organic^{7} Lacustrine^{2} Other^{1}
Rooting Depth (cm):	(<30)^{7} (30-45)^{1} (>45)^{1} nd^{1}
Duff Thickness (cm):	(6-10)^{1} (21-40)^{2} (>40)^{6} nd^{1}



South Brookfield,
Queens County

WC8

Hemlock / Cinnamon fern – Sensitive fern / Sphagnum

Tsuga canadensis / Osmunda cinnamomea – Onoclea sensibilis / Sphagnum spp.

n=7

Concept: Poor to very poorly drained mineral soils support the relatively uncommon Hemlock / Cinnamon fern – Sensitive fern / Sphagnum forest. This is the wettest hemlock forest in Nova Scotia. The Vegetation Type (VT) occurs in warmer ecoregions where it persists as an edaphic climax. WC8 is characterized by hemlock canopy dominance and prominent cinnamon fern, sensitive fern and common green sphagnum.

Vegetation: Crown closure is high in the typically evergreen canopy. Most stands are strongly dominated by hemlock, but some are co-dominated by moderate amounts of red maple. Other trees (e.g. red spruce, yellow birch) are frequent but very sparsely scattered. The understory is relatively open, with low woody and herbaceous density but high sphagnum cover. Characteristic species include cinnamon fern, sensitive fern, wood aster, common green sphagnum and common upland plants.

Environmental Setting: Most occurrences are on poorly drained mineral soil derived from glacial till deposits, but organic sites are occasionally occupied. Soils have moderate nutrient availability, largely maintained by the flow of ground water and sometimes surface water. This ecosystem occurs in sites that are more sheltered than most coniferous wetlands of Nova Scotia. It is somewhat restricted to the warmer western ecoregion, but may also be found in the eastern ecoregion. This ecosystem has been observed in parts of southern New Brunswick and on Prince Edward Island but is much more common in Nova Scotia.

Successional Dynamics: This is a mid to late successional ecosystem, typically supporting uneven-aged stands. Most occurrences are maintained by gap dynamics, but some stands show evidence of small-scale timber harvest. Windthrow and harvesting are the main stand-level disturbance agents. The mature forest may succeed from WC6 (Balsam fir / Cinnamon fern – Three-seeded sedge / Sphagnum), WD6 (Red maple – Balsam fir / Wood aster / Sphagnum) or WD8 (Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum). Depending on disturbance history and nearby stand composition, WC8 may transition from WC5 (Red spruce – Balsam fir/ Cinnamon fern / Sphagnum).

Ecological Features

A common landscape component in northern New England, this uncommon wet forest is the most temperate coniferous wet forest in Nova Scotia. It occurs in sheltered basins, sometimes near open wetlands, but more often as small to moderate-sized patches in upland matrix forest. The dense canopy overtops a sparse woody understory but usually extensive herbaceous and bryophyte cover. In western Nova Scotia, where most stands occur, this ecosystem is a locally important component of landscape structure. It supports unique habitat values including thermal cover for moose, foraging habitat for numerous birds, and shelter for invertebrates, amphibians and reptiles. Few rare plants are documented, but black ash, alder-leafed buckthorn and various Atlantic Coastal Plain species have been observed. Old growth potential is moderate to high.

Characteristic Plants	WC8 Freq. (%)	WC8 Cover (%)
Hemlock	100	41.3
Red maple	100	11.1
Yellow birch	86	6.2
Red spruce	71	8.8
Balsam fir	43	11.3
White ash	43	8.0
White pine	43	5.3
Hybrid spruce	14	40.0
White spruce	14	2.0
Tree Layer (Mean % Cover)		**81**
Hemlock	100	3.3
Red spruce	86	1.5
Red maple	86	0.2
Balsam fir	71	6.5
Yellow birch	57	0.6
White pine	57	0.1
Red oak	43	0.1
Witch-hazel	29	6.0
Poison ivy	29	1.6
Velvet-leaf blueberry	29	0.8
Striped maple	29	0.6
White ash	29	0.6
Winterberry	29	0.5
Shrub Layer (Mean % Cover)		**16**
Cinnamon fern	100	3.6
Goldthread	100	0.5
Wild lily-of-the-valley	86	0.3
Sensitive fern	71	1.6
Bunchberry	71	0.5
Wood aster	71	0.2
Sarsaparilla	57	0.6
Evergreen wood fern	57	0.2
Partridge berry	57	0.2
Starflower	57	0.2
New York fern	43	15.0
Teaberry	43	0.4
Three-seeded sedge	43	0.2
Trailing blackberry	43	0.1
Painted trillium	43	0.1
Twinflower	43	0.1
Wood-sorrel	43	0.1
Water-horehound	29	0.5
Crested wood fern	29	0.3
Creeping snowberry	29	0.1
Dwarf raspberry	29	0.1
Herb Layer (Mean % Cover)		**17**
Bazzania	100	13.4
Stair-step moss	100	10.0
Schreber's moss	86	5.4
Common green sphagnum	71	10.2
Pale fat-leaved sphagnum	57	16.6
Hypnum moss	57	3.3
Ladies' tresses	43	5.5
Broom moss	43	0.4
Wavy dicranum	43	0.4
Prickly sphagnum	29	3.5
Rhizomniums	29	0.8
Mniums	29	0.4
Bryo-Lichen Layer (Mean % Cover)		**64**

Distinguishing Features

Hemlock is diagnostic of this poorly drained mixedwood or softwood forest. Yellow birch, red maple, balsam fir and red spruce are common. The woody shrub layer is primarily regenerating tree species.

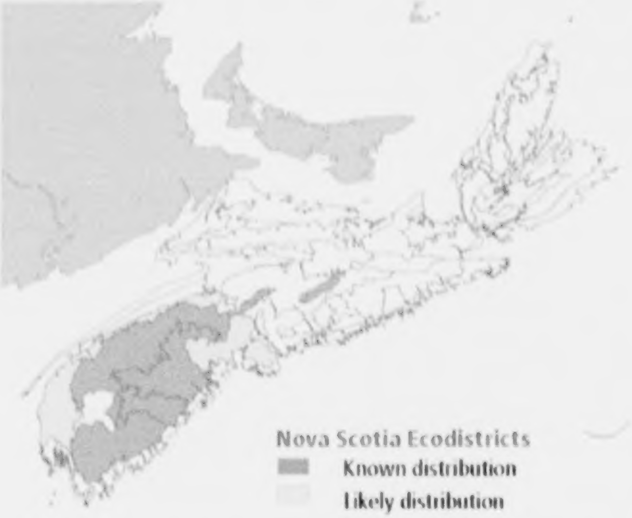
Red fat-leaved sphagnum

Site Characteristics

Slope Position:	Level^{9} Toe^{1}
Surface Stoniness:	(Very - Excessively)^{4} (Non - Slightly)^{3} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{9} (Slightly - Moderately)^{1}
Elevation Range:	44 - 167m
Slope Gradient:	Level^{10}
Aspect:	North^{1} None^{9}
Exposure:	Mod. sheltered^{6} Moderate^{4}
Microtopography:	Level^{8} Slightly^{1} Moderately^{1}
Drainage:	Poor^{7} Very poor^{3}

Soil Characteristics

Soil Type:	ST4^{7} ST10^{1} ST13^{1} ST14^{1}
Parent Material:	Glacial till^{7} Organic^{2} Alluvium^{1}
Rooting Depth (cm):	(<30)^{10}
Duff Thickness (cm):	(6-10)^{3} (11-20)^{6} nd^{1}



WD Wet Deciduous Forest Group

(n = 89)

WD1 White ash / Sensitive fern – Christmas fern

WD2 Red maple / Cinnamon fern / Sphagnum

WD3 Red maple / Sensitive fern – Lady fern / Sphagnum

WD4 Red maple / Poison ivy / Sphagnum . . . . **WD4a** Huckleberry – Inkberry variant

WD5 Trembling aspen / Beaked hazelnut / Interrupted fern / Sphagnum

WD6 Red maple – Balsam fir / Wood aster / Sphagnum

WD7 Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum

WD8 Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum

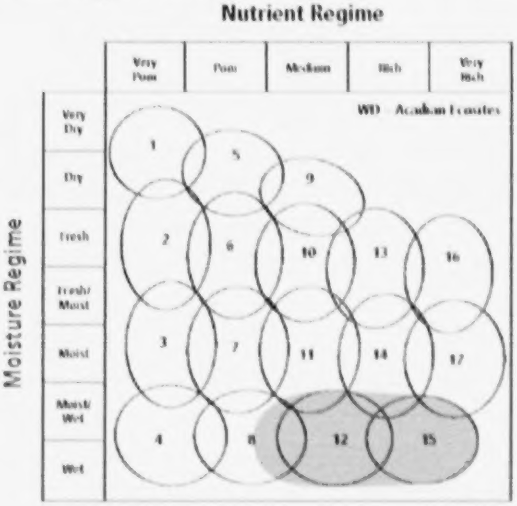
Concept: These are wet forest ecosystems with water at or near the surface for most of the year. They are generally dominated by hardwood species such as red maple and white ash, but also include mixedwood forests with balsam fir. The shrub layer is mainly regenerating tree species, while the well-developed herb layer includes many species of ferns and sedges. Moss abundance is low to moderate. Vegetation Types (VT) are associated with moderate to high nutrient availability with increasing richness indicated by white ash presence. They occur primarily on level to depressional topography with soils derived from either mineral or organic parent material. All VTs in this group are found in the Acadian Ecosite group, with some red maple and balsam fir dominated VTs also found in the Maritime Boreal Ecosite group.

Vegetation: Crown closure can be moderate to high in VTs of this group, but some stands only support widely spaced trees. Red maple is the main overstory species, with other VTs distinguished by trembling aspen and white ash cover. Mixedwood VTs in this group are dominated by red maple with balsam fir or red spruce. Yellow birch, sugar maple, white pine and hemlock can sometimes be found on better drained hummocks. The shrub layer mainly contains regenerating tree species, alder, winterberry and false holly. The herb layer is dominated by sensitive fern, cinnamon fern, lady fern and dewberry. Poison ivy is also found in western Nova Scotia. Sphagnum moss coverage is often extensive.

Environmental Setting: Vegetation types in this group are found on upper and lower flats, lower and toe positions of gentle slopes, shallow depressions and riparian zones. Most sites have little (if any) surface stoniness or exposed bedrock. Soils are generally derived from glacial till, fluvial, lacustrine and/or organic deposits, with fertility enhanced by ground water or seepage inputs. Rooting depth is strongly limited by high water levels. Various VTs form small to large patches on the landscape. This group is found throughout the province, but is prominent in the Northumberland Bras d'Or Lowlands (500), Valley and Central Lowlands (600) and Western (700) ecoregions.

Successional Dynamics: These wet hardwood and mixedwood forests are mainly edaphic climax associations maintained by excessive moisture. Fluctuating water levels, windthrow, insects and disease are significant disturbance agents. Stands within a given VT may display a range of development stages depending on disturbance history and natural senescence.

Edatopic Grids


Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
Wet
WD – Acadian Ecosites
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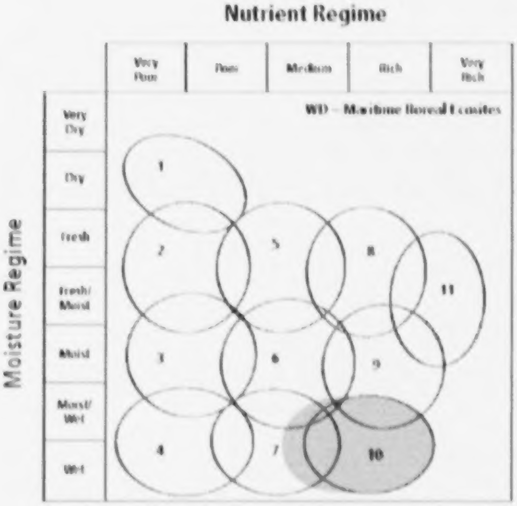
Nutrient Regime
Very Poor
Poor
Medium
Rich
Very Rich
Moisture Regime
Very Dry
Dry
Fresh
Fresh/ Moist
Moist
Moist/ Wet
Wet
WD – Maritime Boreal Ecosites
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3
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6
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11

Ecological Features

Most ecosystems from this group occur on wet soils but some are infrequently found on moist upland sites. Wet deciduous forests are relatively common small patch ecosystems, making unique contributions to landscape structure, hydrologic regime and habitat diversity. Stands often feature small pools of standing water, irregular surface topography and slow moving streams. Organic accumulation in wet deciduous forests is usually lower than in wet coniferous forests, while water flow and nutrient availability is generally higher. Especially wet stands may persist as woodlands, with stunted trees and marsh and/or fen understory species. Wet deciduous forests may provide habitat for invertebrates, lichens, amphibians (e.g. wood frogs, yellow and blue spotted salamander), reptiles (e.g. wood turtles, ribbon snakes), mammals (e.g. moose, water shrew), plants and birds (swamp sparrow, common yellow throat, woodcock, wood thrush, Canada warbler and northern waterthrush). Edaphic climax forests in this group are self sustaining, and many express long term ecological continuity. However, stand dynamics and old growth development are not well understood.

Angevine Lake,
Cumberland County

WD1

White ash / Sensitive fern – Christmas fern

Fraxinus americana / Onoclea sensibilis – Polystichum acrostichoides

n=11

Concept: White ash / Sensitive fern - Christmas fern forest is characterized by prominent white ash and a species-rich herbaceous understory. It is typically found on imperfectly to poorly drained mineral deposits with high nutrient availability, and is one of the richest wet forests in the province.

Vegetation: The well-developed canopy is co-dominated by white ash and red maple, but the latter species occurs with lower cover. Yellow birch and sugar maple are also frequent but seldom abundant and often restricted to the understory. Some stands support moderate to high balsam fir in the overstory, but these stands are uncommon. Black ash has also been recorded as an infrequent and minor component of stand structure. Shrub cover and species richness is reduced. The herbaceous layer is well developed and diverse, frequently including sensitive fern, lady fern, dwarf raspberry, New York fern and Christmas fern, among other species. Bryophyte development is low to moderate, composed of small pockets of upland species and nutrient demanding wetland mosses (e.g. prickly sphagnum).

Environmental Setting: This is primarily a wet forest although it may develop on moist sites. Ground and surface water flow and/or seepage contribute to high moisture and nutrient input. Both mineral and organic soils can be found, but fine to medium textured mineral substrates are most common. It occurs at very low elevation on flats and lower topographic positions of gentle slopes, in shallow depressions, and adjacent to streams and other water bodies. Surface microtopography and exposed bedrock are typically low. Organic matter accumulation is low to moderate. WD1 is rare on Prince Edward Island and unreported from New Brunswick.

Successional Dynamics: The ecosystem is a type of edaphic climax and is expected to persist as described. Stand composition and structure are usually maintained by small- to intermediate-sized disturbance events and limiting site conditions. Due to its ecological setting, WD1 does not shift to other vegetation types after disturbance, but it does change in development stage. Red maple cover can also fluctuate over time. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality through senescence, wind or ice scour.

Ecological Features

The White ash / Sensitive fern – Christmas fern is a productive ecosystem, with high species richness, complex stand structures, and a broad diversity of habitat values. This mature small patch forest is characterized by temperate tree and herbaceous species (e.g. white ash, Christmas fern). Documented rare plants include black ash, but numerous other species may be supported. In spring and early summer, sites are inundated with water, most of which is concentrated in small pools or channels, providing habitat for amphibians and other wildlife. Later in the growing season, surface and ground water levels fall below the rooting zone. Old growth potential is moderate but may be higher in sheltered areas, or on drier soils.

Characteristic Plants

	WD1	
	Freq. (%)	*Cover (%)*
White ash	100	38.0
Red maple	100	20.9
Yellow birch	82	7.8
Balsam fir	55	16.2
White spruce	36	13.3
Sugar maple	27	11.0
Red oak	18	8.0
Trembling aspen	18	6.0
Red spruce	18	5.0
Tree Layer (Mean % Cover)		**87**
Balsam fir	100	5.2
White ash	100	4.3
Sugar maple	64	3.3
Striped maple	64	2.2
Yellow birch	55	1.9
Mountain maple	55	1.0
Red maple	45	2.5
Beaked hazelnut	45	2.4
Shrub Layer (Mean % Cover)		**21**
Dwarf raspberry	91	5.9
Sensitive fern	82	20.8
Violets	82	4.1
Cinnamon fern	82	3.1
Sarsaparilla	82	2.4
Lady fern	73	4.5
Wild lily of the valley	73	1.1
Starflower	73	0.1
New York fern	64	4.2
Evergreen wood fern	64	3.2
Christmas fern	64	1.1
Northern beech fern	55	13.0
Jewelweed	55	6.5
Bladder sedge	55	3.7
Goldthread	55	3.2
Interrupted fern	55	2.3
Bunchberry	55	0.7
Wood aster	55	0.7
Partridge-berry	55	0.2
Bluebead lily	55	0.1
Lions paw	55	0.1
Oak fern	45	5.8
Water-horehound	45	1.9
Short husk	45	0.8
Wood sorrel	45	0.6
Rose twisted stalk	45	0.1
Tall white aster	45	0.1
Wood reed	45	0.1
Crested wood fern	36	0.5
Bristle stalked sedge	36	0.1
Mitrewort	36	0.1
Fringed sedge	27	14.0
Herb Layer (Mean % Cover)		**70**
Fern moss	64	2.2
Stair step moss	64	1.4
Prickly sphagnum	55	4.0
Bazzania	55	1.3
Common green sphagnum	45	9.7
Hypnum moss	45	1.1
Bryo-Lichen Layer (Mean % Cover)		**26**

Distinguishing Features

This is a poorly drained hardwood forest dominated by white ash with lesser levels of red maple. The herb layer is well developed and diverse, often dominated by high fern cover including sensitive fern, lady fern, New York fern and Christmas fern.

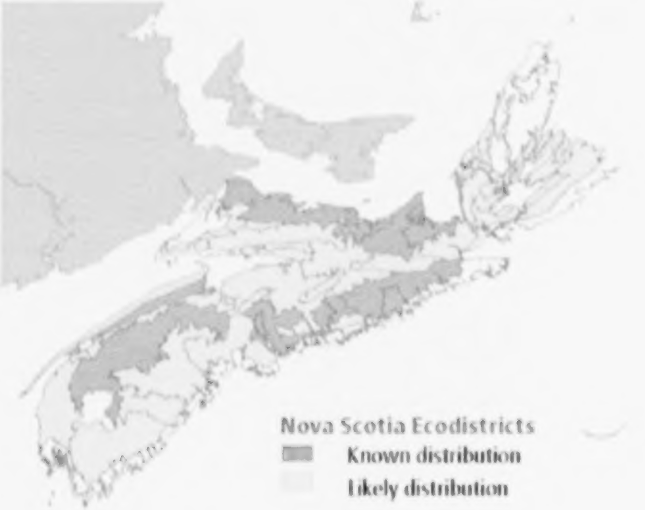
Dwarf raspberry

Site Characteristics

Slope Position: Level^8 Lower^2
Surface Stoniness: (Non - Slightly)^7 (Very - Excessively)^2 nd^1
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 24 - 199m
Slope Gradient: Level^7 Gentle^3
Aspect: North^1 East^1 West^2 None^6
Exposure: Moderate^6 Mod. sheltered^4
Microtopography: Level^8 Slightly^1 Moderately^1
Drainage: Imperfect^4 Poor^4 Very poor^2

Soil Characteristics

Soil Type: ST9^1 ST10^1 ST13^2 ST12^5 ST14^1
Parent Material: Glacial till^5 Alluvium^2 Lacustrine^2 Organic^1
Rooting Depth (cm): (<30)^3 (30-45)^5 nd^2
Duff Thickness (cm): (0-5)^3 (6-10)^3 (11-20)^2 (21-40)^1 nd^1



Burnt Dam Flowage,
Kings County

WD2

Red maple / Cinnamon fern / Sphagnum

Acer rubrum / Osmunda cinnamomea /
Sphagnum spp.

n=8

Concept: This common and widespread ecosystem is one of three wet red maple forests (WD2, WD3 and WD4) classified from Nova Scotia. It has lower tree and herbaceous species richness and soil fertility than WD3, and it lacks the Atlantic Coastal Plain flora that sets it apart from WD4. The Red maple / Cinnamon fern / Sphagnum forest is found on peat or poorly drained mineral soil, with low to moderate nutrient availability. It persists as an edaphic climax.

Vegetation: Canopy development is intermediate to high and almost entirely dominated by red maple. Other tree species are far less frequent and seldom abundant. The woody understory supports moderate cover but is species poor and largely occupied by regenerating trees with scattered wild raisin and speckled alder. The herbaceous layer is better developed but also species poor; only cinnamon fern and goldthread are frequent. Bryophyte development is moderate, composed of sphagnum and lesser amounts of common upland moss and liverwort species. Flat topped sphagnum is characteristic.

Environmental Setting: Soils are usually organic deposits or poorly drained mineral soils, of varying texture. Low ground and surface water flow and poorly-decomposed organic material limit nutrient availability, but some sites provide at least moderate soil richness. Flats, shallow depressions and lower topographic positions of gentle slopes provide suitable habitat across lowland and upland ecoregions of Nova Scotia. Microtopography, surface stoniness and exposed bedrock are minimal. WD2 is common on Prince Edward Island and across south and central New Brunswick.

Successional Dynamics: This early to mid-successional ecosystem is a type of edaphic climax, largely maintained by saturated soil and reduced rooting potential. It is expected to persist as described, but after disturbance, it could transition to WD8 (Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum) or, on better sites, WD7 (Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum). Windthrow and harvesting are the main stand-level disturbance agents but in their absence, mortality of individuals and patches of trees through senescence, ice scour, flooding and/or other minor events, can create uneven-aged stands.

Ecological Features

WD2 is the most common deciduous wet forest in Nova Scotia. It is found in small to moderate sized basins or depressions, usually featuring small pools or narrow channels of standing or slowly moving water. Sites rarely support notable microrelief, and trees on those with more pronounced surface topography are often limited to hummocks. This is a moderately productive ecosystem, but few rare plants, other than black ash, are documented. Similar to other wet deciduous forests, WD2 supports unique habitat values (e.g. as an important early source of nectar and pollen), complex stand structures, and important biogeochemical and landscape functions. Wet deciduous forests generally occur on sites that are richer than mixedwood or coniferous wet forests, but some exceptions occur. Canopy tree senescence and uprooting are relatively common and are often followed by vigourous stump sprouting. This process may support a uniquely persistent and poorly understood form of old growth.

Characteristic Plants	WD2 Freq. (%)	WD2 Cover (%)
Red maple	100	49.1
Black spruce	44	6.3
Grey birch	33	1.0
White birch	22	20.0
Yellow birch	22	7.5
White pine	22	5.0
Balsam fir	22	3.5
Red oak	11	10.0
Large-tooth aspen	11	2.0
Mountain ash	11	2.0
Trembling aspen	11	2.0
Black ash	11	0.1
Tamarack	11	0.1
White ash	11	0.1
White spruce	11	0.1
Tree Layer (Mean % Cover)		**62**
Red maple	100	7.2
Black spruce	89	3.4
Wild raisin	89	3.1
Speckled alder	67	3.0
Lambkill	67	1.9
Balsam fir	67	1.5
Huckleberry	56	11.6
Velvet-leaf blueberry	56	3.0
White pine	56	1.9
Winterberry	44	3.0
False holly	33	0.5
Grey birch	33	0.3
Meadow-sweet	33	0.3
Labrador tea	22	1.1
Shrub Layer (Mean % Cover)		**32**
Cinnamon fern	89	26.4
Bunchberry	78	0.8
Goldthread	67	1.4
Three-seeded sedge	56	10.4
Bracken	56	7.2
Starflower	56	0.1
New York fern	44	14.0
Sarsaparilla	44	0.7
Wild lily-of-the-valley	44	0.2
Crested wood fern	44	0.1
Teaberry	33	6.2
Tall white aster	33	3.3
Dwarf raspberry	33	1.0
Bluebead lily	33	0.5
Violets	33	0.3
Trailing blackberry	33	0.2
Wood aster	33	0.2
Herb Layer (Mean % Cover)		**60**
Flat-topped sphagnum	67	14.5
Hypnum moss	67	3.1
Schreber's moss	67	0.6
Pale fat-leaved sphagnum	56	19.2
Common green sphagnum	44	3.3
Red fat-leaved sphagnum	33	13.3
Ladies' tresses	33	5.4
Hair-cap moss	33	1.7
Wavy dicranum	33	0.4
Bryo-Lichen Layer (Mean % Cover)		**32**

Distinguishing Features

Red maple dominates this poorly drained hardwood forest. Cinnamon fern is well developed in the understory. The shrub and herb layers are poorly developed and contain species of low nutrient requirement. This shrub/herb layer difference helps separate WD2 from WD3.

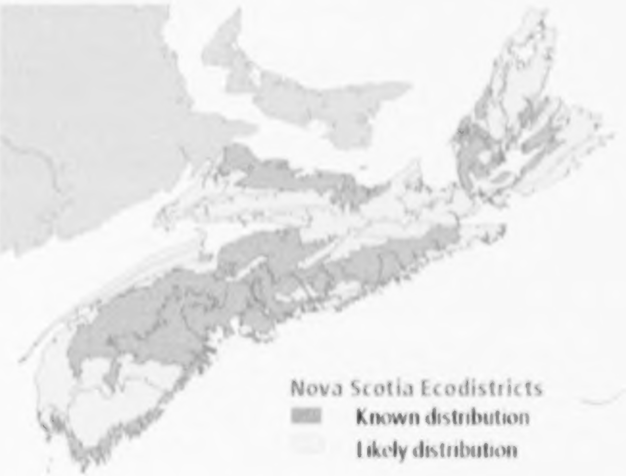
Wild raisin

Site Characteristics

Slope Position:	Level^{7} Depression^{1} Middle^{1} Upper^{1}
Surface Stoniness:	(Non - Slightly)^{8} (Very - Excessively)^{2}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	18 - 195m
Slope Gradient:	Level^{8} Gentle^{2}
Aspect:	North^{1} West^{1} None^{8}
Exposure:	Moderate^{7} Mod. exposed^{1} Exposed^{1} Mod. sheltered^{1}
Microtopography:	Level^{6} Slightly^{3} Strongly^{1}
Drainage:	Poor^{6} Imperfect^{3} Very poor^{1}

Soil Characteristics

Soil Type:	ST14^{5} ST7^{3} ST12^{1} nd^{1}
Parent Material:	Organic^{6} Glacial till^{1} Lacustrine^{1} Till/Bedrock^{1} nd^{1}
Rooting Depth (cm):	(<30)^{1} (30-45)^{1} (>45)^{1} nd^{7}
Duff Thickness (cm):	(0-5)^{1} (11-20)^{1} (>40)^{4} nd^{4}



Wallace Bay,
Cumberland County

WD3

Red maple / Sensitive fern – Lady fern / Sphagnum

Acer rubrum / Onoclea sensibilis – Athyrium filix-femina / Sphagnum spp.

n=11

Concept: The relatively common Red maple / Sensitive fern – Lady fern / Sphagnum is one of three wet red maple forests (WD2, WD3 and WD4) in Nova Scotia. This low elevation ecosystem is more nutrient and species rich than WD2, and it lacks the Atlantic Coastal Plain flora that characterize WD4. It is usually found on peat or poorly to very poorly drained mineral deposits, persisting as an edaphic climax. The forest is characterized by red maple canopy dominance and a species-rich herbaceous understory.

Vegetation: The closed canopy is strongly dominated by red maple with far less prominent amounts of black spruce, white birch and balsam fir. The woody understory is sparse and largely comprised of regenerating canopy species with frequent but low levels of balsam fir and wild raisin. Herbaceous and bryophyte cover are less than levels reported for other deciduous wet forests of Nova Scotia, but moderately species rich. Notable species include sensitive fern, lady fern, dwarf raspberry and pale fat-leaved sphagnum.

Environmental Setting: Flats, shallow depressions and, less often, lower positions of gentle slopes provide suitable habitat. Sites have low to moderate exposure with little microtopography, exposed bedrock or surface stoniness. The low elevation ecosystem develops on both organic deposits and poorly drained mineral soil of varied origin and texture. Glacial and post-glacial river and lake plains are common landforms. Enriched surface and/or ground water inputs provide moderate to high nutrient availability. This Vegetation Type (VT) is found scattered throughout provincial lowlands and uplands, but is particularly prominent in the Northumberland/Bras d'Or and Eastern ecoregions. WD3 is common on Prince Edward Island and across south and central New Brunswick.

Successional Dynamics: This forest can be expressed at a variety of successional stages, but is typically mid-successional. It is a type of edaphic climax and is expected to persist as described, although, depending on disturbances and nearby seed sources, it could transition to WD7 (Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum) or WD8 (Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum). Windthrow and harvesting are the main stand-level disturbance agents but between these, tree senescence and other minor disturbances can promote development of uneven-aged stands.

Ecological Features

This is the richest red maple wet forest in Nova Scotia, and the second richest among all wet deciduous forests, after WD1. Productivity is high but this potential may not be fully expressed by either tree height or age, both of which tend to be limited by saturated conditions. Like all wet deciduous forests, soil and groundwater nutrient richness increases understory development, species diversity and associated habitat structures. Few rare plants (e.g. meadow horsetail, black ash) are documented but the ecosystem provides valuable habitat for numerous species (e.g. as an important early source of nectar and pollen). Small pools or tracts of standing water are common in the spring and early summer, but usually dry up later. Canopy tree senescence and uprooting are relatively common, and are often followed by vigourous stump sprouting. This process may support a uniquely persistent and poorly understood form of old growth.

Characteristic Plants	WD3	
	Freq. (%)	Cover (%)
Red maple	100	49.5
Balsam fir	55	7.8
White ash	55	5.7
Yellow birch	36	6.8
White spruce	27	7.0
Red spruce	18	13.5
Black spruce	18	8.5
Sugar maple	18	8.5
White birch	18	3.5
Hemlock	18	2.5
Tree Layer (Mean % Cover)		**69**
Balsam fir	82	3.3
Red maple	73	4.5
Wild raisin	64	1.7
Speckled alder	55	11.8
White ash	45	1.4
Winterberry	36	4.3
Red oak	36	0.3
Yellow birch	27	2.6
White spruce	27	1.3
False holly	27	1.0
Serviceberry	27	1.0
Shrub Layer (Mean % Cover)		**20**
Sensitive fern	91	15.3
Cinnamon fern	91	3.3
Dwarf raspberry	73	3.6
Lady fern	73	2.4
Violets	64	3.2
Wood aster	64	2.4
Goldthread	64	0.6
Wild lily-of-the-valley	64	0.5
Crested wood fern	64	0.3
Starflower	55	0.9
Bladder sedge	55	0.3
New York fern	45	6.6
Sarsaparilla	45	0.3
Interrupted fern	36	2.4
Three seeded sedge	36	2.4
Jewelweed	36	1.9
Blue flag	36	1.5
Bunchberry	36	1.0
Sedges	36	0.8
Woodland horsetail	36	0.6
Bugleweed	27	4.8
Tall white aster	27	1.8
Northern beech fern	27	1.7
Spinulose wood fern	27	1.3
Herb Layer (Mean % Cover)		**49**
Pale fat-leaved sphagnum	73	4.1
Common green sphagnum	45	29.0
Fern moss	45	4.4
Stair-step moss	45	1.5
Brachythecium moss	36	0.9
Bazzania	36	0.5
Prickly sphagnum	27	6.0
Schreber's moss	27	3.3
Broom moss	27	1.4
Hypnum moss	27	0.9
Bryo-Lichen Layer (Mean % Cover)		**26**

Distinguishing Features

Red maple dominates this poorly drained hardwood forest which has a better developed herb layer compared to WD2. Nutrient demanding herbs in the understory include sensitive fern, lady fern and dwarf raspberry. Pale fat-leaved sphagnum and common green sphagnum are common.

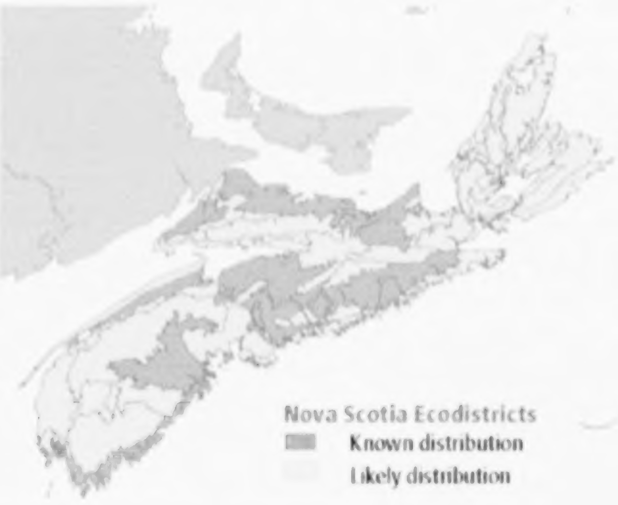
Lady fern

Site Characteristics

Slope Position: Level^{8} Depression^{1} Middle^{1}
Surface Stoniness: (Non - Slightly)^{10}
Bedrock Outcrop: (Non-rocky)^{10}
Elevation Range: 2 - 112m
Slope Gradient: Level^{9} nd^{1}
Aspect: West^{1} None^{9}
Exposure: Moderate^{5} Mod. sheltered^{1} Mod. exposed^{3} nd^{1}
Microtopography: Level^{5} Slightly^{4} nd^{1}
Drainage: Poor^{8} Very poor^{2}

Soil Characteristics

Soil Type: ST4^{3} ST14^{3} ST10^{2} ST7^{1} ST9^{1}
Parent Material: Organic^{4} Glacial till^{3} Lacustrine^{2} Alluvium^{1}
Rooting Depth (cm): (<30)^{7} nd^{3}
Duff Thickness (cm): (0-5)^{1} (11-20)^{2} (21-40)^{2} (>40)^{1} nd^{4}



Nova Scotia Ecodistricts
▨ Known distribution
□ Likely distribution

Sixth Lake Stream, Queens County

WD4

Red maple / Poison ivy / Sphagnum

Acer rubrum / Toxicodendron radicans / Sphagnum spp.

WD4a

Huckleberry – Inkberry variant

Gaylussacia baccata – Ilex glabra

n=27

Concept: This Vegetation Type (VT) is distinguished from other wet red maple forests (WD2 and WD3) by the presence of Atlantic Coastal Plain flora like poison ivy, catbriar, inkberry, Elliot's goldenrod and other plants. WD4 is found in wet organic depressions or on wet mineral flats, where it persists as an edaphic climax. Small- to intermediate-scale disturbances, including windthrow, flooding, ice-scour and timber harvest are common components of stand history.

Vegetation: Canopy layers are strongly dominated by red maple or co-dominated by red maple and black spruce. Mixedwood occurrences are defined by WD4a. In some stands, low to moderate levels of balsam fir, tamarack and/or hemlock may be supported. Black ash and/or white ash are infrequent canopy components. The well-developed woody understory is largely comprised of regenerating trees and poison ivy with scattered pockets of winterberry, speckled alder and/or huckleberry. Cinnamon fern is the only frequent wetland herb. Other coastal plain species (e.g. inkberry, catbriar, highbush blueberry, Elliot's goldenrod, Massachusetts fern, skunk cabbage, button sedge, Virginia chain fern, Torrey's Sphagnum, etc.) seldom co-occur with great frequency but at least one or more species is usually represented in each stand. Bryophyte cover is very high and usually dominated by pale fat-leaved sphagnum and flat top sphagnum.

Environmental Setting: WD4 is mainly found in western Nova Scotia, often adjacent to larger rivers and/or lakes. This low elevation ecosystem is usually on poorly drained flats or in shallow depressions, with moderate exposure. WD4 can be found on riverside or lakeside alluvium (floodplain) deposits or on glacial tills, but most stands develop on organic deposits. Low surface microtopography, exposed bedrock and surface stoniness are typical. This forest is not known outside Nova Scotia, but could occur in southwestern New Brunswick.

Successional Dynamics: This forest is usually expressed at mid-successional stages and persists as an edaphic climax. It is maintained by small- to intermediate-scale canopy disturbances (e.g. windthrow, flooding, ice-scour and timber harvest) and limiting site conditions. Depending on disturbance history and local conditions, WD4a could also transition to WC7a (Tamarack – Black spruce / Lambkill / Sphagnum variant Huckleberry – Inkberry) or even CE1a (Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum variant poison ivy). Windthrow, harvesting and flooding are potential stand-level disturbance agents, while natural senescence can create uneven age class and stand structures between larger disturbance events.

Ecological Features

WD4 supports more Atlantic Coastal Plain flora (ACPF) than any other VT in Nova Scotia. ACPF are temperate plants largely known from an expansive and relatively flat area along the southeastern seaboard of the United States. Although the coastal plain only extends north to Massachusetts, many ACPF occur in small, isolated areas of Canada including the Atlantic Coast and inland areas of western Nova Scotia. Productivity, surface water accumulation, and structural heterogeneity of this ecosystem are variable, but most occurrences are at least moderately productive, supporting well-developed canopy features, moist micro-depressions and tall patches of ferns. Stands along slow moving rivers are prone to ice scour as well as longer periods of flooding and soil saturation. Numerous rare plants have been documented from this small patch ecosystem. Canopy tree senescence and uprooting are often followed by vigourous stump sprouting, which may support a uniquely persistent and poorly understood form of old growth.

Characteristic Plants

	WD4		WD4a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red maple	100	55.1	100	42.4
Balsam fir	53	3.0	70	8.7
Black spruce	41	4.4	90	13.2
Yellow birch	29	9.2	10	4.0
White pine	29	3.2	40	2.3
White ash	18	10.7	10	16.0
Tamarack	18	10.3	60	6.3
Black ash	12	6.5	10	1.0
Tree Layer (Mean % Cover)		**69**		**70**
Red maple	82	6.0	90	4.0
Balsam fir	82	1.9	90	4.1
Winterberry	76	4.3	40	2.8
Speckled alder	71	11.4	60	2.5
Wild raisin	59	1.3	50	1.6
Red oak	53	0.5	50	1.5
White pine	53	0.4	70	3.3
Poison ivy	47	16.0	30	1.7
Huckleberry	47	3.2	60	3.1
Black spruce	41	1.9	90	5.0
Meadow-sweet	41	0.8	20	0.4
Western poison ivy	35	5.5	20	1.6
Lambkill	35	0.7	70	11.9
Lowbush blueberry	29	1.7	50	9.0
Serviceberry	24	0.1	40	0.3
False holly	18	1.0	60	2.1
Labrador tea	12	0.1	50	0.9
Shrub Layer (Mean % Cover)		**36**		**41**
Cinnamon fern	88	11.6	100	25.2
Marsh fern	71	0.7	20	0.8
Wild lily-of-the-valley	71	0.2	80	0.5
Blue joint	65	11.8	40	0.8
Stiff sedge	59	34.1	30	34.7
Blue flag	59	0.2	40	0.6
Goldthread	53	0.9	90	1.9
Starflower	53	0.3	90	0.7
Sensitive fern	47	4.6	10	1.0
Bugleweed	47	4.3		
Dwarf raspberry	41	3.3	30	2.8
Massachusetts fern	41	0.9	10	6.0
Trailing blackberry	41	0.8	50	2.5
Spinulose wood fern	41	0.7		
Crested wood fern	41	0.4	20	0.1
Sarsaparilla	41	0.2	70	1.2
Bunchberry	29	2.1	50	1.5
Partridge-berry	18	0.1	60	0.4
Creeping snowberry	12	0.5	70	2.0
Teaberry		40	4.9	
Herb Layer (Mean % Cover)		**62**		**54**
Pale fat-leaved sphagnum	65	18.0	50	25.4
Flat-topped sphagnum	47	28.1	60	20.8
Hypnum moss	47	1.0	70	5.0
Bazzania	47	0.7	80	2.0
Broom moss	41	0.3	70	1.3
Red fat-leaved sphagnum	29	21.5	50	21.7
Ladies' tresses	18	15.3	60	2.5
Schreber's moss	18	2.4	40	2.3
Stair-step moss	18	0.7	40	3.4
Bryo-Lichen Layer (Mean % Cover)		**43**		**65**

Distinguishing Features

This wet red maple forest is typically found only in the western counties with a moderate to highly developed woody shrub component including poison ivy, speckled alder, huckleberry and meadow-sweet. Atlantic Coastal Plain plants are often present; usually found next to lakes, rivers and large streams. Cinnamon fern and sphagnum mosses are common.

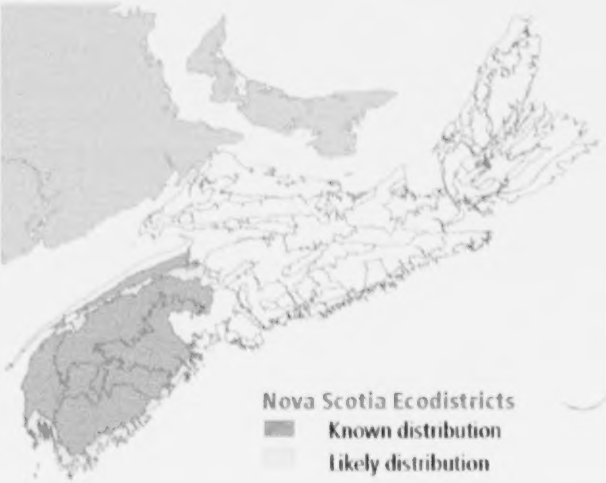
Winterberry

Site Characteristics

Slope Position:	Level^{8} Depression^{1} Lower^{1}
Surface Stoniness:	(Non – Slightly)^{8} (Moderately)^{1} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	21 – 155m
Slope Gradient:	Level^{9} Gentle^{1}
Aspect:	None^{9} Other^{1}
Exposure:	Moderate^{5} Mod. sheltered^{2} Mod. exposed^{2} nd^{1}
Microtopography:	Level^{7} Slightly^{2} nd^{1}
Drainage:	Very poor^{7} Poor^{3}

Soil Characteristics

Soil Type:	ST14^{8} ST4^{2}
Parent Material:	Organic^{8} Alluvium^{1} Glacial till^{1}
Rooting Depth (cm):	(<30)^{4} (30-45)^{3} nd^{3}
Duff Thickness (cm):	(6-20)^{1} (21-40)^{2} (>40)^{2} nd^{5}



Wallace Bay,
Cumberland County

WD5

Trembling aspen / Beaked hazelnut / Interrupted fern / Sphagnum

Populus tremuloides / Corylus cornuta / Osmunda claytoniana / Sphagnum spp.

n=7

Concept: Poorly drained flats and gentle slopes support this relatively uncommon wet forest, which is characterized by trembling aspen canopy dominance and high sphagnum cover. This is the wettest trembling aspen forest in Nova Scotia. Red maple is a frequent but lesser canopy component, while balsam fir and/or spruce are occasionally present with low cover.

Vegetation: Canopy layers are strongly dominated by trembling aspen or co-dominated by trembling aspen and red maple. Small patches or scattered balsam fir and spruce (usually red) are not uncommon. Black ash is infrequently a component of this forest type, but may be restricted to the understory. Lower woody layers are moderately well developed but largely dominated by regenerating canopy species; beaked hazelnut is the only characteristic shrub. Interrupted fern, wood aster, dwarf raspberry and several common upland forest species comprise the sometimes sparse herbaceous layer. Bryophyte abundance is similar, and only common green sphagnum is prominent.

Environmental Setting: WD5 is mainly found in the Northumberland/Bras d'Or ecoregion, but can occur in other parts of the mainland Nova Scotia. This low elevation ecosystem is usually on poorly drained flats or lower slopes, with moderate exposure. Most sites have little surface stoniness or exposed bedrock, but slight microtopography. WD5 sites are associated with low to moderate nutrient availability, shallow to moderate rooting potential and moderate humus accumulation. Both mineral and organic soils can be found, but mineral substrates (of variable texture) are more common. WD5 is widespread in northern Prince Edward Island and across both southwestern and eastern New Brunswick.

Successional Dynamics: This is an early-successional forest but wet soils limit its potential for successional development. Depending on disturbance history, site fertility and nearby seed sources, WD5 could maintain itself or succeed to WD3 (Red maple / Sensitive fern – Lady fern / Sphagnum), WD7 (Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum) or WD8 (Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum). Windthrow and harvesting are the main stand-level disturbance agents. This Vegetation Type (VT) usually originates from agricultural land clearing or clearcutting.

Ecological Features

Despite its relative scarcity, this small-patch VT has somewhat low conservation value. Most stands originate through farming and show signs of fertilizer pollution, erosion and hydrologic alteration. However, in many agricultural landscapes, young seral forests, such as WD5, provide the only notable habitat for some wildlife. For example, aspen leaves, twigs and bark are highly nutritious, providing an important food source, while the tree's soft wood is easily excavated by cavity nesters. This ecosystem's potential for self-renewal from root suckering is high, provided that erosion and pollution inputs are minimized. The VT occurs in small to medium sized basins or in small perched depressions. Stands are usually very productive, but no species of conservation concern were found in available plot data. Similar to other wetlands, WD5 contributes to carbon, nitrogen and water budgets and helps regulate groundwater quality and flow.

Characteristic Plants	WD5 Freq. (%)	WD5 Cover (%)
Trembling aspen	100	47.4
Red maple	100	15.4
Balsam fir	43	14.7
Black spruce	43	4.0
White spruce	43	2.7
Red spruce	14	20.0
Red pine	14	15.0
Grey birch	14	10.0
Large-tooth aspen	14	5.0
White ash	14	5.0
Tree Layer (Mean % Cover)		**79**
Red maple	100	2.7
Beaked hazelnut	86	0.4
Balsam fir	71	5.9
Wild raisin	57	1.3
Trembling aspen	57	0.5
Serviceberry	57	0.1
Black spruce	43	12.3
Lambkill	43	9.7
Lowbush blueberry	29	20.5
Speckled alder	29	14.5
White ash	29	2.1
Grey birch	29	1.1
Willows	29	1.1
White spruce	29	0.8
Shrub Layer (Mean % Cover)		**33**
Sarsaparilla	100	1.0
Interrupted fern	86	2.6
Wild lily-of-the-valley	86	1.6
Bunchberry	71	2.4
Starflower	71	0.3
Wood aster	71	0.3
Bracken	57	14.8
Dwarf raspberry	57	10.0
Goldthread	57	1.4
Cinnamon fern	43	5.7
Evergreen wood fern	43	0.1
New York fern	29	6.5
Teaberry	29	3.6
Strawberry	29	1.6
Ground pine	29	0.1
Lady fern	29	0.1
Shinleaf	29	0.1
Short husk	29	0.1
White lettuce	29	0.1
Herb Layer (Mean % Cover)		**31**
Hair-cap moss	86	1.1
Schreber's moss	86	1.1
Common green sphagnum	71	19.5
Stair-step moss	57	4.3
Broom moss	57	1.8
Pale fat leaved sphagnum	43	5.0
Shaggy moss	43	1.3
Hypnum moss	43	0.8
Flat topped sphagnum	43	0.5
Fern moss	29	3.0
Wavy dicranum	29	0.3
Bryo-Lichen Layer (Mean % Cover)		**24**

Distinguishing Features

This is a poorly drained forest dominated by trembling aspen. Beaked hazelnut is characteristic of the shrub understory. Bracken, dwarf raspberry and common green sphagnum are the most abundant of an otherwise sparsely-developed herb and moss layers.

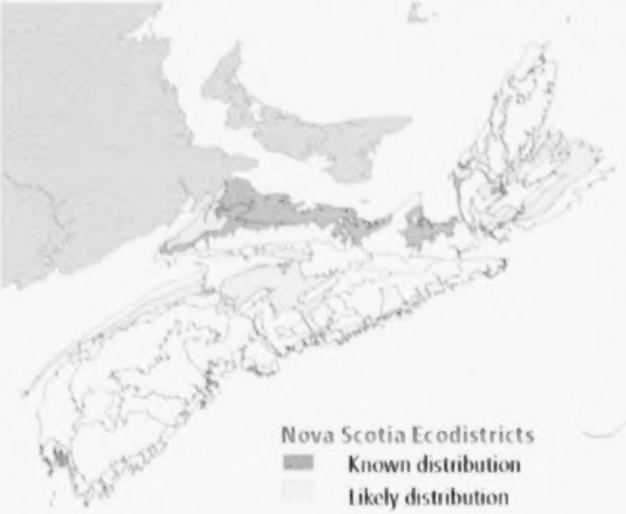
Interrupted fern

Site Characteristics

Slope Position:	Level^{6} Lower^{4}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	9 - 87m
Slope Gradient:	Level^{6} Gentle^{4}
Aspect:	North^{1} East^{1} None^{4}
Exposure:	Moderate^{10}
Microtopography:	Level^{3} Slightly^{4} Strongly^{1}
Drainage:	Poor^{7} Imperfect^{3}

Soil Characteristics

Soil Type:	ST4^{4} ST7^{4} ST10^{2}
Parent Material:	Glacial till^{9} Lacustrine^{1}
Rooting Depth (cm):	(<30)^{1} (30-45)^{6} nd^{1}
Duff Thickness (cm):	(0-5)^{3} (6-10)^{4} (11-20)^{3}



MacElmons Pond,
Belmont, Colchester County

WD6

Red maple – Balsam fir / Wood aster / Sphagnum

Acer rubrum – Abies balsamea / Aster acuminatus / Sphagnum spp.

n=7

Concept: Red maple – Balsam fir / Wood aster / Sphagnum is one of three wet mixedwood forests (WD6, WD7 and WD8) recognized in Nova Scotia, each largely distinguished by important differences in canopy composition and more minor differences in soil fertility and understory composition. This relatively common Vegetation Type (VT) is characterized by red maple and balsam fir co-dominance, moderate to high herbaceous cover and a well-developed bryophyte layer of sphagnum moss. It is usually found on poorly drained mineral soil, with low to medium nutrient availability.

Vegetation: Crown closure is moderate to high, although some stands support more widely spaced trees. The canopy is co-dominated by red maple and balsam fir; other tree species are infrequent and seldom abundant. The understory supports low to moderate levels of woody species but higher herbaceous cover. Characteristic vascular plants include false holly, cinnamon fern, creeping snowberry, wood aster and three seeded sedge. Bryophyte development is moderate, composed of sphagnum moss and lesser amounts of common upland species. Small patches of pale fat-leaved sphagnum, common green and/or flat-topped sphagnum are sometimes present.

Environmental Setting: This is primarily a wet forest although occasionally it develops on moist sites. Soils are usually derived from glacial deposits, of varying texture, with at least some ground and/or surface water flow (organic deposits are also possible); nutrient availability is low to medium. The ecosystem occurs at low elevation in shallow depressions and on flats and cool gentle slopes with little microtopography. Rooting potential is strongly limited by high water level and sometimes compacted soils. Most occurrences are in the Western and Valley/Central Lowland ecoregions but outlying stands are scattered throughout the remainder of the mainland and lowland areas of Cape Breton. The VT is common on Prince Edward Island and across south and central New Brunswick.

Successional Dynamics: This ecosystem can be expressed at a variety of successional stages, but most stands are mid-successional. It is a type of edaphic climax (i.e. largely persisting because of limiting site conditions). Depending on the ecological context and local disturbance regime, WD6 could maintain itself or transition to WD7 (Red maple / Cinnamon fern / Sphagnum) or WC6 (Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum) after disturbance. Tree senescence, windthrow and intermediate-scaled harvest events like firewood and pulpwood cutting, are the primary disturbance agents, but harvesting and insect infestation can also occur at the stand level. Between disturbance events, uneven-aged stands can develop through tree mortality originating with senescence.

Ecological Features

Mixedwood forests may support vertebrate and invertebrate species associated with both coniferous and deciduous wetlands. Wildlife which utilize either hardwood or softwood structures will often seek small clumps of target canopy trees within broader matrices of dissimilar species. The Red maple – Balsam fir / Wood aster / Sphagnum VT is a moderately productive mixedwood forest, with a well-developed canopy and often dense understory strata. Small pools or narrow channels of standing or very slowly moving water are typical, and may provide important habitat for amphibians and other wildlife. This small patch ecosystem supports similar biodiversity values as WD2, but occurs in more sheltered areas with lower peat accumulations. These characteristics may influence the VT's ecology and contributions to local landscape structure and function. Observations of alder-leafed buckthorn and black ash were found in available plot data.

Characteristic Plants	WD6 Freq. (%)	WD6 Cover (%)
Red maple	100	37.3
Balsam fir	100	27.3
Yellow birch	57	3.3
Red spruce	43	11.7
White birch	43	3.0
White spruce	29	5.0
Tamarack	14	23.0
Black spruce	14	18.0
White ash	14	3.0
White pine	14	2.0
Tree Layer (Mean % Cover)		**75**
Balsam fir	86	2.9
Red maple	71	1.7
False holly	71	0.2
Speckled alder	43	2.5
Winterberry	43	1.7
Lambkill	43	0.5
Mountain maple	29	11.5
Black spruce	29	6.5
Red spruce	29	2.3
Bristly black currant	29	0.3
Lowbush blueberry	29	0.1
Velvet-leaf blueberry	29	0.1
Wild raisin	29	0.1
Shrub Layer (Mean % Cover)		**14**
Cinnamon fern	100	17.1
Goldthread	100	2.3
Wild lily-of-the-valley	100	0.4
Starflower	86	1.1
Bunchberry	71	2.3
Creeping snowberry	71	0.6
Wood aster	71	0.3
Dwarf raspberry	57	3.3
Sarsaparilla	57	2.8
Twinflower	57	2.6
Violets	57	0.6
Bluebead lily	57	0.5
Three seeded sedge	57	0.1
New York fern	43	25.0
Mitrewort	43	0.8
Crested wood fern	43	0.2
Strawberry	43	0.1
Interrupted fern	29	6.5
Oak fern	29	5.0
Woodland horsetail	29	1.0
Lady fern	29	0.5
Manna-grass	29	0.2
Herb Layer (Mean % Cover)		**53**
Stair-step moss	86	14.0
Bazzania	86	2.3
Broom moss	57	1.0
Common green sphagnum	43	20.0
Pale fat-leaved sphagnum	43	15.0
Schreber's moss	43	13.7
Shaggy moss	43	6.7
Hypnum moss	43	5.8
Flat topped sphagnum	29	12.0
Ladies' tresses	29	6.5
Bryo-Lichen Layer (Mean % Cover)		**55**

Distinguishing Features

Red maple and balsam fir in the overstory layer define this wet mixedwood forest. Characteristic plants include false holly, cinnamon fern, creeping snowberry, wood aster and three seeded sedge. Common green sphagnum and pale fat-leaved sphagnum are common.

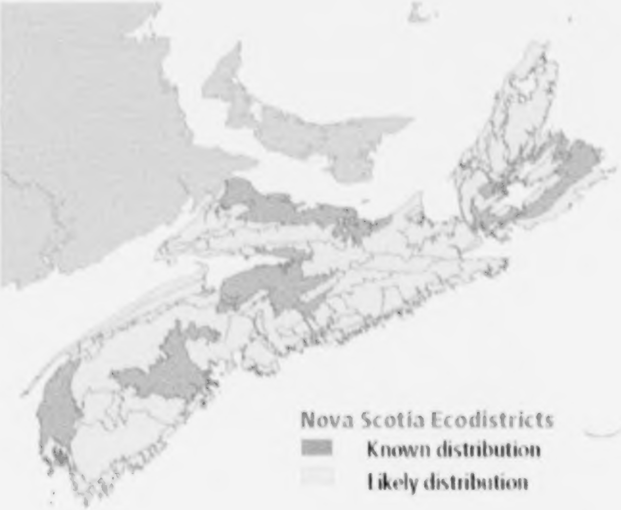
Creeping snowberry

Site Characteristics

Slope Position:	Level^{8} Lower^{1} Toe^{1}
Surface Stoniness:	(Non - Slightly)^{10}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	5 - 124m
Slope Gradient:	Level^{9} Gentle^{1}
Aspect:	North^{1} West^{1} None^{8}
Exposure:	Moderate^{9} Mod. Sheltered^{1}
Microtopography:	Level^{7} Slightly^{3}
Drainage:	Poor^{4} Very poor^{4} Imperfect^{2}

Soil Characteristics

Soil Type:	ST7^{6} ST4^{1} ST9^{1} ST10^{1} ST14^{1}
Parent Material:	Glacial till^{7} Organic^{1} Glaciofluvial^{1} nd^{1}
Rooting Depth (cm):	(<30)^{9} (30-45)^{1}
Duff Thickness (cm):	(0-5)^{1} (6-10)^{1} (11-20)^{6} (21-40)^{1} (>40)^{1}



Sherbrooke Lake,
Lunenburg County

WD7

Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum

Abies balsamea – Fraxinus americana /
Osmunda cinnamomea – Thelypteris noveboracensis /
Sphagnum spp.

n=12

Concept: Balsam fir – White ash / Cinnamon fern – New York fern / Sphagnum Vegetation Type (VT) is the wettest and richest of the three wet mixedwood forests (WD6, WD7 and WD8) found in the province. This closed canopy forest occurs on wet mineral soils or peat, with intermediate or high nutrient availability. The unit is co-dominated by white ash and one or more coniferous tree species. Balsam fir is particularly prominent, but most stands also feature low levels of spruce and yellow birch. The understory is largely dominated by herbaceous and sphagnum cover.

Vegetation: The closed canopy is co-dominated by white ash and balsam fir, with lesser spruce (usually red) and yellow birch. Low to moderate cover is typical in the woody understory, where regenerating trees and fly honeysuckle are characteristic. The well-developed herbaceous layer includes frequent cinnamon fern, dwarf raspberry, sensitive fern and New York fern, among other species. Bryophyte development is moderate, composed of sphagnum, shaggy moss and lesser amounts of common upland species. Common green sphagnum is prominent.

Environmental Setting: This moderately exposed wet forest is invariably found on level sites with slight microtopography and little exposed bedrock or surface stones. Soils have intermediate to high nutrient availability, largely maintained by enriched seepage, ground and/or surface water inputs. It occurs at low elevation across level to undulating landscapes on organic deposits or fine to medium textured mineral soils. Most stands are in upland regions of mainland Nova Scotia and across lower elevations of Cape Breton. The WD7 ecosystem has not been documented in New Brunswick or Prince Edward Island, but it likely occurs in southern New Brunswick.

Successional Dynamics: This ecosystem can be expressed at a variety of successional stages, but most stands are mid-successional, persisting as an edaphic climax. It is maintained by limiting site conditions and small- to intermediate-scaled disturbances. Tree senescence, windthrow and smaller scaled timber harvest events are the primary mechanisms of renewal. WD7 does not generally shift to other vegetation types after disturbance, but a transition to WD1 (White ash / Sensitive fern – Christmas fern) is possible on higher fertility sites. Excluding harvesting, stand-level disturbance events are rare but insect infestation may cause a significant reduction of balsam fir in some stands.

Ecological Features

Rich temperate mixedwood forests are uncommon in Nova Scotia, partly because nutrient demanding conifer species (e.g. cedar) are seldom present. By virtue of its rarity and restricted Canadian range, lesser disturbed examples of this unusual ecosystem present a conservation opportunity. WD7 may support a mix of wet coniferous and deciduous forest values, including important wildlife habitat structures, hydrologic and biogeochemical functions. Few species of conservation concern were found in available plot data. Similar to other wetlands, WD7 contributes to carbon and nitrogen budgets, helps regulate groundwater quality and flow, and represents an important component of landscape structure.

Characteristic Plants

	WD7	
	Freq. (%)	Cover (%)
Balsam fir	100	18.6
White ash	100	10.8
Red maple	83	16.5
Yellow birch	83	12.2
Red spruce	58	14.4
Black spruce	42	13.4
White spruce	25	14.0
Sugar maple	17	8.5
Hemlock	17	4.5
Tree Layer (Mean % Cover)		**75**
Balsam fir	83	8.7
Fly honeysuckle	83	0.7
Yellow birch	75	0.6
White ash	58	4.1
Red maple	58	0.9
Red spruce	50	0.7
Sugar maple	50	0.4
Serviceberry	50	0.1
Striped maple	42	0.1
Winterberry	33	12.7
Mountain maple	25	18.0
Shrub Layer (Mean % Cover)		**25**
Cinnamon fern	92	17.2
Dwarf raspberry	92	9.4
Sarsaparilla	83	2.4
Bunchberry	83	1.7
New York fern	67	25.4
Sensitive fern	67	4.1
Wild lily of the valley	67	2.4
Goldthread	67	1.7
Northern beech fern	67	1.2
Starflower	67	0.4
Three seeded sedge	58	3.3
Wood sorrel	58	1.3
Bladder sedge	58	0.6
Wood aster	58	0.4
Partridge berry	58	0.3
Twinflower	58	0.3
Crested wood fern	58	0.1
Woodland horsetail	50	2.4
Lady fern	50	1.9
Bluebead lily	50	0.1
Evergreen wood fern	42	0.6
Creeping snowberry	42	0.1
Interrupted fern	33	10.5
Oak fern	33	9.6
Blue joint	33	2.7
Meadow rue	33	2.0
Short husk	25	5.0
Herb Layer (Mean % Cover)		**76**
Stair step moss	83	6.7
Shaggy moss	75	8.3
Bazzania	75	4.3
Common green sphagnum	58	42.1
Schreber's moss	42	9.5
Pale fat leaved sphagnum	25	28.3
Flat topped sphagnum	25	17.7
Prickly sphagnum	25	9.2
Bryo-Lichen Layer (Mean % Cover)		**62**

Distinguishing Features

White ash is diagnostic of this wet mixedwood forest. Fly honeysuckle is characteristic along with a well developed herbaceous layer that often includes cinnamon fern, dwarf raspberry, sensitive fern and New York fern.

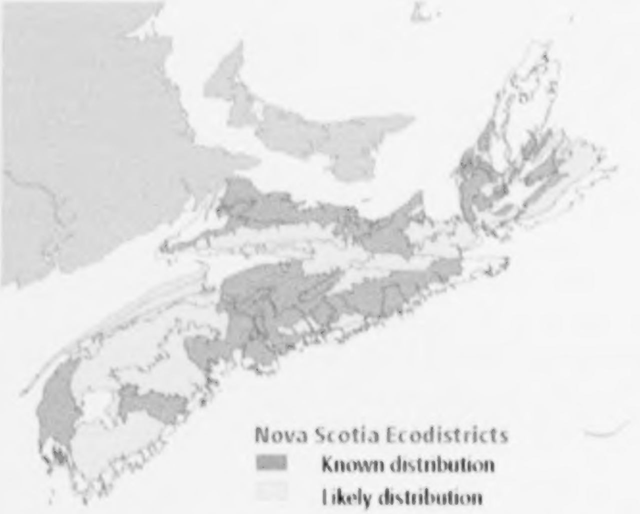
Fly-honeysuckle

Site Characteristics

Slope Position:	Level^{7} Depression^{1} Lower^{1} Toe^{1}
Surface Stoniness:	(Non - Slightly)^{9} (Moderately)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	50 - 189m
Slope Gradient:	Level^{10}
Aspect:	East^{1} South^{1} West^{1} None^{7}
Exposure:	Moderate^{7} Mod. exposed^{2} Mod. sheltered^{1}
Microtopography:	Slightly^{5} Level^{3} nd^{2}
Drainage:	Poor^{5} Very poor^{5}

Soil Characteristics

Soil Type:	ST14^{6} ST4^{1} ST7^{1} ST10^{1} ST13^{1}
Parent Material:	Organic^{4} Glacial till^{3} Alluvium^{1} Glaciofluvial^{1} Lacustrine^{1}
Rooting Depth (cm):	(<30)^{6} (30-45)^{3} nd^{1}
Duff Thickness (cm):	(6-10)^{1} (11-20)^{1} (21-40)^{7} (>40)^{1} nd^{1}



Nova Scotia Ecodistricts

▨	Known distribution
☐	Likely distribution

*Tyndal Road,
Cumberland County*

WD8

Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum

Picea rubens – Acer rubrum / Oxalis acetosella – Onoclea sensibilis / Sphagnum spp.

n=6

Concept: This ecosystem is one of three wet mixedwood forests in Nova Scotia. These Vegetation Types (VTs) are mostly distinguished by major differences in canopy composition and more minor differences in soil fertility and understory composition. This mature closed canopy forest ecosystem is characterized by red spruce and red maple co-dominance, moderate to high herbaceous cover and a well-developed sphagnum moss layer. It usually occurs on moist to wet mineral soils where it may persist as a type of edaphic climax.

Vegetation: The closed canopy is co-dominated by red spruce and red maple, with lesser balsam fir. Low to moderate cover is typical in the woody understory, where regenerating trees and false holly are characteristic. The well-developed herbaceous layer includes frequent cinnamon fern, wood sorrel, northern beech fern, wood aster, three seeded sedge, dwarf raspberry and sensitive fern, among other common upland plants. Bryophyte development is moderate, composed of sphagnum and lesser amounts of common upland moss and liverwort species.

Environmental Setting: This low elevation forest occurs on moist to wet sites. Most soils are poorly drained glacial tills of varying texture, with limited ground and/or surface water inputs, and only intermediate nutrient availability. Flats, shallow depressions and gentle slopes with moderate micro-topography are typical sites. Aspect is variable. Most occurrences are in the Nova Scotia Uplands and Western ecoregions. WD8 is uncommon on Prince Edward Island but widespread and abundant across south and central New Brunswick.

Successional Dynamics: This ecosystem can be expressed at a variety of successional stages, but most stands are mid-successional. It is maintained by limiting site conditions and typically small- to intermediate-scaled disturbances (e.g. tree mortality, windthrow and timber harvest events). Wet soils generally limit the potential for successional development, but depending on the ecological context and disturbance regime, WD8 could either maintain itself or transition to WC5 (Red spruce – Balsam fir/ Cinnamon fern / Sphagnum) or WC8 (Hemlock / Cinnamon fern – Sensitive fern / Sphagnum). Transition to WD3 (Red maple / Sensitive fern – Lady fern / Sphagnum) is also possible on richer sites. Stand level disturbances are uncommon, but windthrow and timber harvest are possible mechanisms of renewal. Tree mortality through senescence can promote uneven-aged stands.

Ecological Features

This small patch forest often forms a transition between open wetland and upland forest, providing distinct if not important landscape functions. Mixedwood forests may support wildlife species associated with both coniferous and deciduous ecosystems. Wildlife that make use of either hardwood or softwood structures will often seek small clumps of target canopy trees within broader matrices of different species. In WD8, hardwood canopy components are often associated with past disturbance events or areas with increased surface and/or subsurface water. Sites are at least slightly mounded, providing increased microhabitat variability. The Red spruce – Red maple / Wood sorrel – Sensitive fern / Sphagnum is a moderately productive mixedwood forest, with a well-developed canopy and often dense herbaceous and bryophyte layers. These forests may develop long-term continuity and an old growth character.

Characteristic Plants	WD8 Freq. (%)	WD8 Cover (%)
Red spruce	100	37.8
Red maple	83	16.6
Balsam fir	83	7.8
Yellow birch	50	6.7
White spruce	33	17.5
Hemlock	33	12.0
Black spruce	17	10.0
Tree Layer (Mean % Cover)		**73**
Balsam fir	83	8.3
Red spruce	83	4.2
Red maple	67	2.1
False holly	67	0.5
Velvet-leaf blueberry	50	0.2
Yellow birch	50	0.1
Fly honeysuckle	33	1.6
Mountain maple	33	0.6
Lambkill	33	0.3
Shrub Layer (Mean % Cover)		**15**
Cinnamon fern	100	5.1
Wood-sorrel	100	3.5
Bunchberry	100	1.6
Goldthread	100	1.6
Starflower	100	0.2
Northern beech fern	83	2.0
Sarsaparilla	83	1.7
Evergreen wood fern	83	1.5
Wood aster	83	0.5
Violets	83	0.2
Three seeded sedge	67	2.8
Twinflower	67	1.9
Dwarf raspberry	67	1.8
Woodland horsetail	67	1.2
Sensitive fern	67	1.1
Wild lily-of-the-valley	67	0.6
Creeping snowberry	67	0.3
New York fern	50	38.3
Interrupted fern	50	14.0
Partridge-berry	50	1.0
Bluebead lily	50	0.7
Indian pipe	50	0.1
Lady fern	33	4.5
Hay-scented fern	33	4.0
Oak fern	33	1.3
Crested wood fern	33	0.3
Herb Layer (Mean % Cover)		**56**
Bazzania	100	7.8
Schreber's moss	83	14.9
Stair-step moss	83	6.6
Hypnum moss	67	1.5
Common green sphagnum	50	13.3
Fern moss	50	6.0
Hair-cap moss	50	0.8
Rhizomniums	50	0.6
Pale fat-leaved sphagnum	33	25.0
Prickly sphagnum	33	3.5
Broom moss	33	2.6
Shaggy moss	33	2.5
Wavy dicranum	33	1.1
Bryo-Lichen Layer (Mean % Cover)		**64**

Distinguishing Features

Red maple and red spruce in the overstory layer define this wet mixedwood forest. False holly, cinnamon fern, three seeded sedge, dwarf raspberry and sensitive fern are good indicators of this vegetation type.

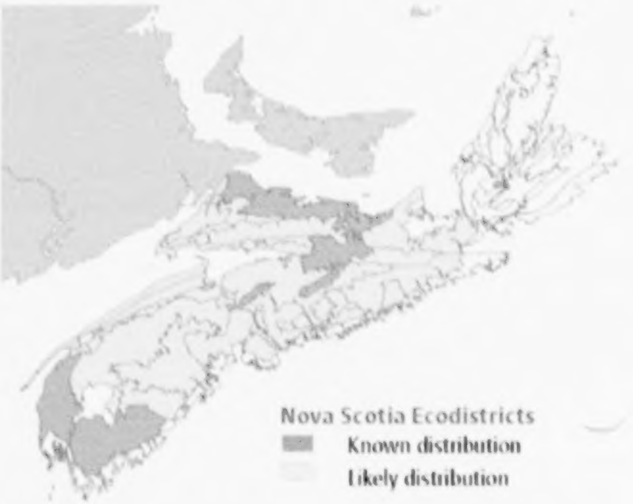
Woodland horsetail

Site Characteristics

Slope Position:	Level^{1} Lower^{1} Depression^{2} Toe^{2}
Surface Stoniness:	(Non - Slightly)^{8} (Moderately)^{1} (Very - Excessively)^{1}
Bedrock Outcrop:	(Non-rocky)^{10}
Elevation Range:	13 - 148m
Slope Gradient:	Level^{5} Gentle^{5}
Aspect:	North^{1} East^{1} South^{1} West^{1} None^{6}
Exposure:	Moderate^{7} Mod. exposed^{1} Mod. sheltered^{1} Sheltered^{1}
Microtopography:	Level^{3} Slightly^{3} Moderately^{2} Strongly^{2}
Drainage:	Poor^{7} Imperfect^{3}

Soil Characteristics

Soil Type:	ST4^{4} ST7^{3} ST10^{2} ST14^{1}
Parent Material:	Glacial till^{7} Organic^{2} Lacustrine^{1}
Rooting Depth (cm):	(<30)^{8} (30-45)^{1} nd^{1}
Duff Thickness (cm):	(11-20)^{5} (21-40)^{3} nd^{2}



Successional Development

Succession, as defined by Odum (1971), is an orderly process of community development that involves changes in species structure and community processes with time; it is reasonably directional and, therefore, predictable.

Successional development generally proceeds through a number of distinct stages (e.g. early, middle, late) that replace one another in a predictable sequence and which culminates in a relatively stable and self-perpetuating community condition called a climax. Climax communities are not static, but are subject to gradual long-term renewal, maintaining themselves (more or less) until stand-level disturbance causes a return to an earlier successional stage.

A climatic (or zonal) climax results when a forest community reflects regional climate norms and is not unduly affected by local extremes in site conditions. Although Nova Scotia is divided into nine climate-based ecoregions (Neily et al. 2005), for FEC purposes the province can be effectively represented by two ELC groups, referred to as Acadian and Maritime Boreal (See *Forest Ecosystem Classification for Nova Scotia: Part III Ecosites (2010)* for more details).

In the Acadian group, zonal climax forests are dominated by species such as hemlock, red spruce, sugar maple and beech. In the Maritime Boreal group, climax species include white spruce, balsam fir, red maple and white birch.

An edaphic climax results when a forest community cannot progress to the climatic climax due to local extremes in site conditions (e.g. low nutrient sites, dry sites, wet sites and floodplain sites). Species associated with these sites include black spruce, tamarack, red maple, pine and white ash.

Figures 3 to 7 summarize possible successional links between VTs in the Spruce Hemlock (SH), Spruce Pine (SP), Tolerant Hardwood (TH), Intolerant Hardwood (IH) and Mixedwood (MW) forest groups – the main forest groups found in the province.

Information contained in Figures 3 to 7 can be used to aid forest management planning; however, users are reminded that many variables can (and do) affect stand successional dynamics including: (i) the type and size of disturbance, (ii) the frequency and severity of disturbance, (iii) age class and structure at time of disturbance, (iv) presence / absence of advanced regeneration, and (iv) presence / absence of seed sources, etc. As a result, the successional links shown in Figures 3 to 7 should be considered a guide to what is possible, not a hard and fast rule or prescription.

Figure 3. Spruce Hemlock (SH) Forest Group – Successional Links

	Early	Middle	Late
SH1	IH3, IH4, IH6, MW4, MW5	MW2, SH5, SH6, SH8	MW3, **SH1**, SH2, SH3
SH2	IH4, IH6, MW4, MW5	MW2, SH5, SH6, SH8	SH1, **SH2**, SH3
SH3	IH3, IH4, IH5, IH6, MW4, MW5	MW2, SH5, SH6, SH7, SH8	SH1, SH2, **SH3**
SH4	IH1, IH2, IH4, IH6, MW4, MW5	MW2, SH5, SH8, SH9	**SH4**
SH5	IH3, IH4, IH5, IH6, MW4, MW5	MW2, **SH5**, SH7, SH8	MW1, MW3, SH1, SH2, SH3, SH4
SH6	IH3, IH4, IH5, IH6, MW4, MW5	MW2, **SH6**, SH7, SH8	MW1, MW3, SH1, SH2, SH3
SH7	IH3, IH4, IH5, IH6, MW4	MW2, SH5, SH6, **SH7**, SH8	MW1, MW3, SH3
SH8	IH3, IH4, IH5, IH6, MW5	SH5, SH6, SH7, **SH8**, SH10	MW1, MW3, SH1, SH2, SH3, SH4
SH9	IH4, IH6	**SH9**, SP4	SH4, SP5
SH10	IH4, IH6, MW4, MW5	SH8, **SH10**, TH7	MW1, MW3, TH8

Figure 4. Spruce Pine (SP) Forest Group – Successional Links

	Early	Middle	Late
SP1	**SP1**	SP2, SP3, SP4	SP5
SP2	SP1, **SP2**	SP3, SP4	SP5
SP3	SP1, SP2	**SP3**, SP4	SP5
SP4	SH9, SP1, SP2, SP8, SP9, SP10	IH2, SP3, **SP4**, SP6	SP5
SP5	SH9, SP1, SP2, SP8, SP10	SP3, SP4, SP6	**SP5**
SP6	IH1, SP8, SP10	SP4, **SP6**	SP5
SP7	SP7	**SP7**	SP7
SP8	**SP8**	SP4, SP6	SP5, SP9
SP9	IH1, SP8	IH2, SP4	**SP9**
SP10	**SP10**	SP4, SP6	SP5

Figure 5. Intolerant Hardwood (IH) Forest Group – Successional Links

	Early	Middle	Late
IH1	**IH1**, IH2	SP6	SH4, SP9
IH2	IH1, **IH2**	SP4	SH4, SP9
IH3	**IH3**, IH4, IH5, IH6	IH7, MW2, SH5, SH6, SH7, SH8	MW1, MW3, SH1, SH3, TH1, TH2, TH3, TH4, TH6, TH8
IH4	**IH4**	IH7, MW2, MW4, SH5, SH6, SH7, SH8, SH9, SH10	MW1, MW3, SH1, SH2, SH3, SH4, TH6, TH8
IH5	**IH5**, MW5	IH7, MW4, SH5, SH6, SH7, SH8	MW1, MW3, SH3, TH1, TH2, TH3, TH4, TH8
IH6	**IH6**	IH7, MW2, SH5, SH6, SH7, SH8, SH9, SH10	MW1, MW3, SH1, SH2, SH3, SH4, TH1, TH2, TH6, TH8
IH7	IH3, IH4, IH5, IH6	**IH7**, TH7	MW1, TH1, TH2, TH3, TH6, TH8

Figure 6. Tolerant Hardwood (TH) Forest Group – Successional Links

	Early	Middle	Late
TH1	IH3, IH5, IH6	IH7, TH6, TH7	**TH1**, TH8
TH2	IH3, IH5, IH6	IH7, TH6, TH7	**TH2**, TH8
TH3	IH3, IH5	IH7	**TH3**
TH4	IH3, IH5		**TH4**
TH5		IH7	TH1, TH2, **TH5**
TH6	IH3, IH4, IH6	IH7	TH1, TH2, **TH6**
TH7	MW4, MW5	IH7, SH10, **TH7**	MW1, MW3, TH1, TH2
TH8	IH3, IH4, IH5, IH6	IH7, SH10	TH1, TH2, **TH8**

Figure 7. Mixedwood (MW) Forest Group – Successional Links

	Early	Middle	Late
MW1	IH3, IH4, IH5, IH6, MW4, MW5, SH8	IH7, MW2, SH5, SH6, SH7, SH10, TH7	**MW1**, MW3
MW2	IH3, IH4, IH6, MW4, MW5	**MW2**, SH5, SH6, SH7	MW1, MW3, SH1, SH2, SH3, SH4
MW3	IH3, IH4, IH5, IH6, MW4, MW5, SH8	MW2, SH5, SH6, SH7, SH10, TH7	MW1, **MW3**, SH1
MW4	IH4, IH5	MW2, **MW4**, SH5, SH6, SH7, SH10, TH7	MW1, MW3, SH1, SH2, SH3, SH4
MW5	IH5, **MW5**	MW2, SH5, SH6, SH8, SH10, TH7	MW1, MW3, SH1, SH2, SH3, SH4

Coarse Woody Debris and Snags

As described in McCurdy and Stewart (2005), coarse woody debris (CWD) is defined as dead wood larger than 7.5 cm in diameter and laying horizontally at 45 degrees or less. It is measured using line transect sampling to estimate volume (m^3/ha). Snags are dead trees larger than 7.5 cm in diameter at breast height (1.3 m) and standing at 45 degrees or more. They are measured using prism point sampling to estimate density (#/ha) and basal area (m^2/ha).

Dead wood is a key component of forest ecosystems underpinning many natural cycles and supporting a large proportion of forest biodiversity (Freedman et al. 1996; Evans and Kelty 2010). Dead wood levels are naturally dynamic and fluctuate in response to species mix, stand age, disturbance history, site productivity and decay processes. In general, dead wood occurs at high levels following natural disturbance, declines into early maturity (due to decay), then slowly increases in quantity and size as stands transition to old growth through stem exclusion and gap disturbance processes (Evans and Kelty 2010).

A summary of CWD and snag data collected from 1,448 FEC plots are presented below (Tables 3 to 16). Data are reported by type (softwood and hardwood) and diameter class, variables which are correlated with wildlife habitat use and long-term nutrient supply. Large diameter dead wood is most valuable, persisting longer and providing habitat for a greater number of species (Evans and Kelty 2010).

In addition, a diameter to volume regression was used to convert snag density to snag volume to allow reporting of total dead wood volume (CWD + Snag) for each forest group (Figure 8). See Appendix F for details of this regression analysis.

Notes:

> Coarse woody debris volumes were calculated for decay classes 1 through 4 only using Equation 5 in McCurdy and Stewart (2005). Volume estimates do not include corrections for line slope and debris tilt.
>
> Dead wood summaries are not based on random sampling and therefore cannot be claimed as being statistically representative of dead wood volumes in mature stands in Nova Scotia. Overall values are, however, consistent with those reported for mature age classes from provincial inventory plots (Townsend 2004). Users should exercise caution when interpreting forest group dead wood data.
>
> Reported totals in Tables 3 to 16 may not equal class sums due to rounding.

Figure 8. Average volume of deadwood (coarse woody debris and snag) by forest group

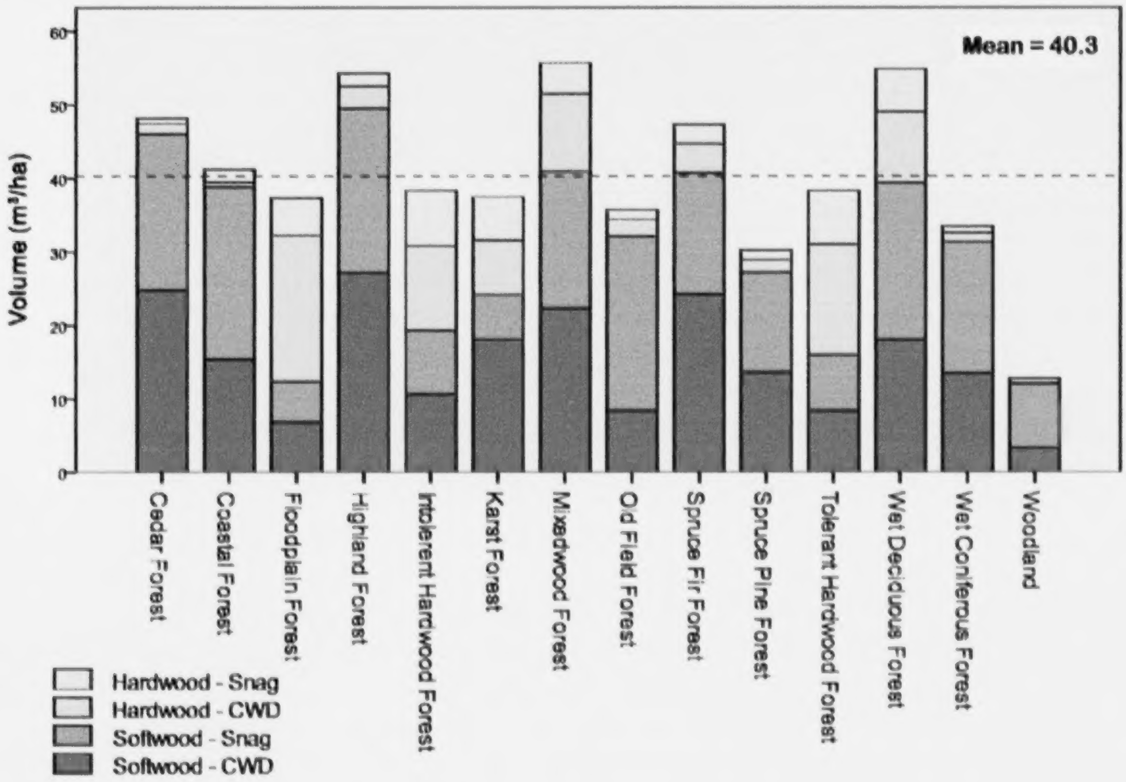


Table 3. Cedar Forest (CE) n=9

Diameter Class (cm)	Coarse Woody Debris (m³/ha)			Snags #/ha (m²/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	11	1	12	303 (3.6)	13 (0.2)	316 (3.8)
20 to 28	10	0	10	42 (1.6)	0 (0.0)	42 (1.6)
30+	4	0	4	8 (0.7)	0 (0.0)	8 (0.7)
Total	25	1	26	353 (5.8)	13 (0.2)	366 (6.1)

Table 4. Coastal Forest (CO) n=29

Diameter Class (cm)	Coarse Woody Debris (m³/ha)			Snags #/ha (m²/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	10	1	11	581 (5.8)	75 (0.7)	657 (6.5)
20 to 28	4	0	4	41 (1.4)	0 (0.0)	41 (1.4)
30+	1	0	1	2 (0.1)	0 (0.0)	2 (0.1)
Total	15	1	16	624 (7.3)	75(0.7)	699 (8.0)

Table 5. Floodplain Forest (FP) n=54

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	3	6	9	36 (0.4)	46 (0.4)	83 (0.8)
20 to 28	4	7	11	13 (0.4)	9 (0.3)	23 (0.8)
30+	0	7	7	5 (0.5)	6 (0.7)	11 (1.2)
Total	7	20	27	55 (1.3)	61 (1.5)	116 (2.8)

Table 6. Highland Forest (HL) n=51

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	13	2	15	401 (4.2)	19 (0.2)	421 (4.4)
20 to 28	12	1	13	39 (1.5)	1 (0.0)	40 (1.5)
30+	2	1	3	8 (0.7)	2 (0.3)	10 (0.9)
Total	27	3	30	447 (6.3)	23 (0.5)	470 (6.8)

Table 7. Intolerant Hardwood Forest (IH) n=138

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	6	8	15	99 (1.1)	130 (1.3)	229 (2.5)
20 to 28	4	2	6	18 (0.7)	18 (0.6)	36 (1.3)
30+	1	1	2	5 (0.4)	5 (0.4)	10 (0.8)
Total	11	12	22	122 (2.2)	153 (2.4)	274 (4.6)

Table 8. Karst Forest (KA) n=7

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	11	6	17	16 (0.3)	53 (0.6)	69 (0.9)
20 to 28	7	2	9	27 (0.9)	24 (0.9)	51 (1.7)
30+	0	0	0	4 (0.3)	2 (0.3)	6 (0.6)
Total	18	7	25	47 (1.4)	78 (1.7)	126 (3.1)

Table 9. Mixedwood Forest (MW) n=98

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	10	5	15	159 (2.0)	45 (0.5)	204 (2.6)
20 to 28	6	4	10	57 (2.1)	7 (0.3)	64 (2.3)
30+	6	2	8	6 (0.6)	3 (0.4)	9 (1.0)
Total	22	11	33	222 (4.7)	55 (1.2)	277 (5.9)

Table 10. Old Field Forest (OF) n=59

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	5	2	7	305 (3.3)	21 (0.2)	326 (3.5)
20 to 28	2	1	3	59 (2.0)	5 (0.2)	64 (2.2)
30+	1	0	1	11 (1.0)	0 (0.0)	12 (1.0)
Total	8	2	11	375 (6.3)	26 (0.4)	402 (6.7)

Table 11. Open Woodland (OW) n=43

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	2	0	2	146 (1.8)	14 (0.1)	161 (1.9)
20 to 28	1	0	1	20 (0.7)	1 (0.1)	21 (1.9)
30+	0	0	0	0 (0.0)	0 (0.0)	0 (0.0)
Total	3	0	3	166 (2.5)	15 (0.2)	181 (2.7)

Table 12. Spruce Hemlock Forest (SH) n=278

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	13	2	14	216 (2.4)	18 (0.2)	234 (2.7)
20 to 28	7	2	9	32 (1.2)	7 (0.3)	39 (1.4)
30+	4	1	5	8 (0.8)	2 (0.2)	10 (1.0)
Total	24	4	28	256 (4.4)	27 (0.7)	283 (5.1)

Table 13. Spruce Pine Forest (SP) n=170

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	11	1	12	236 (2.4)	23 (0.2)	259 (2.6)
20 to 28	2	0	3	33 (1.1)	4 (0.1)	37 (1.3)
30+	1	0	1	4 (0.3)	1 (0.1)	5 (0.4)
Total	14	2	15	272 (3.9)	28 (0.4)	300 (4.3)

Table 14. Tolerant Hardwood Forest (TH) n=264

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	4	5	9	59 (0.7)	67 (0.7)	127 (1.4)
20 to 28	3	5	8	25 (0.9)	18 (0.7)	43 (1.6)
30+	1	5	6	4 (0.3)	6 (0.7)	10 (1.0)
Total	8	15	23	88 (1.9)	92 (2.1)	180 (4.0)

Table 15. Wet Coniferous Forest (WC) n=174

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	9	1	9	339 (3.6)	6 (0.1)	345 (3.7)
20 to 28	4	0	5	36 (1.3)	4 (0.1)	40 (1.4)
30+	0	0	1	4 (0.3)	0 (0.0)	4 (0.4)
Total	13	1	15	379 (5.2)	10 (0.3)	389 (5.4)

Table 16. Wet Deciduous Forest (WD) n=74

Diameter Class (cm)	Coarse Woody Debris (m^3/ha)			Snags #/ha (m^2/ha)		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
10 to 18	9	5	14	281 (3.2)	87 (0.9)	368 (4.1)
20 to 28	4	3	7	55 (1.9)	13 (0.4)	68 (2.4)
30+	4	3	7	6 (0.6)	5 (0.5)	11 (1.0)
Total	18	11	28	342 (5.7)	105 (1.8)	447 (7.5)

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Appendices

Appendix A - Glossary

Ecological and forest management related terms found in this guide are defined below. References are given where definitions (or portions thereof) have been taken directly from other sources.

Advanced regeneration – trees of variable age found in the understory shrub layer which are in a position to grow into the canopy when overstory competition has been removed by disturbance or natural mortality.

Aeolian – see Parent material.

Alluvium – see Parent material.

Aspect – the direction of a downhill slope expressed in degrees or as a compass point.

Atlantic Coastal Plain flora (ACPF) – a group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens and estuaries and which are found primarily in southwestern Nova Scotia. The distribution of this group of plants extends down the eastern coast of the USA with isolated populations in Nova Scotia and along the Great Lakes.

Azonal – the opposite of zonal. Also see edaphic.

Bedrock – Solid rock that underlies gravel, soil, or other surficial material (AGI 1984). Also see Parent material.

Bryophytes – mosses, hornworts and liverworts.

Canopy – the uppermost continuous layer of branches and foliage in a stand of trees.

Purple trillium (Trillium erectum)

Climatic climax forest – see Zonal climax forest.

Climax community – a relatively stable and self-perpetuating community condition which maintains itself (more or less) until stand level disturbance causes a return to an earlier successional stage.

Coarse woody debris – in this guide, dead wood larger than 7.5 cm in diameter and laying horizontally at 45 degrees or less.

Co-dominant – see Crown class.

Colluvium – see Parent material.

Covertype – refers to the relative percentage of softwood versus hardwood species in the overstory of a stand. In this guide, covertype classes are:

Softwood Overstory coverage of softwood species is 75% or more.

Hardwood Overstory coverage of hardwood species is 75% or more.

Mixedwood Overstory coverage of softwood and hardwood species is between 25% and 75%.

Crown class – refers to groups of trees in a forest with crowns of similar development and occupying a similar position in the canopy (Dunster and Dunster 1996). Three crown classes are defined:

Dominant: Defines trees with crowns extending above the general level of the main canopy receiving full light from above and partial light from the sides.

Co-dominant: Defines trees with crowns forming the general level of the main canopy receiving full light from above and comparatively little light from the sides.

Intermediate: Defines trees with crowns extending into the lower portion of the main canopy, but shorter in height than co-dominants. These trees receive little direct light from above and none from the sides.

Cyanolichen – a lichen whose photosynthetic partner is a cyanobacterium (also called blue-green alga).

Disturbance – a discreet force that causes significant change in structure and/or composition of a forest (Dunster and Dunster 1996). Also see Natural disturbance.

Dominant – see Crown class.

Drainage class – drainage class reflects the length of time it takes water to be removed from a soil in relation to supply. Six drainage classes used in this guide are (adapted from ECSS 1983):

Rapid: Water is removed from the soil rapidly in relation to supply.

Well: Water is removed from the soil readily, but not rapidly.

Moderately Well: Water is removed from the soil somewhat slowly in relation to supply.

Imperfect: Water is removed from the soil sufficiently slowly in relation to supply to keep the soil wet for a significant part of the growing season.

Poor: Water is removed so slowly in relation to supply that the soil remains wet for a comparatively large part of the time (when not frozen).

Very Poor: Water is removed from the soil so slowly that the water table remains at or near the surface for the greater part of the time (when the soil is not frozen).

Drumlin – A low, smoothly rounded, elongate hill of compact glacial till built under the margin of the ice and shaped by its flow. Its long axis is parallel to the direction of ice movement (AGI 1984).

Duff layer – see Forest floor.

Ecodistrict – a subdivision of ecoregion and the third level within the Nova Scotia ecological land classification system. It is based on distinct assemblages of relief, geology and landform.

Ecological Continuity – ecosystems (forests) for which there has been a continuity of ecological processes for long periods of time. Long and uninterrupted development in the absence of catastrophic disturbance fosters structural and species complexity, often marked by the presence of indicator lichens and fungi sensitive to disturbance and requiring specialized microhabitats.

Ecological land classification – a classification of lands from an ecological perspective based on factors such as climate, physiography and site conditions. It is a framework used to delineate ecosystems at different landscape scales and includes five levels: ecozone, ecoregion, ecodistrict, ecosection and ecosite.

Ecoregion – the second level in the Nova Scotia ecological land classification system used to characterize a distinctive regional climate as expressed by vegetation. There are nine ecoregions identified in Nova Scotia.

Edaphic – refers to the influence of soil and site conditions on plant growth. In this guide, edaphic is used to express the dominance of site over climate in vegetation development.

Edaphic climax forest – results when a forest community cannot progress to the zonal climax due to local extremes in site conditions.

Edatopic grid – a two-dimensional diagram used to plot ecosystems (and subsequently ecosites) with respect to their relative moisture and nutrient regimes.

Ericaceous – plants in or related to the heath family (Ericaceae) usually found on acidic (nutrient poor) soils including *Kalmia spp.*, *Vaccinium spp.* and *Rhododendron spp.* (Dunster and Dunster 1996).

Epiphytic – refers to a plant (lichen) that grows on the outside of another plant in a non-parasitic relationship.

Even-aged – describes a forest, stand, or vegetation type in which relatively small age differences exist between individual trees.

Fluvial – a general term to describe stream or river processes which involve the transport and deposition of sediment (Dunster and Dunster 1996). When used in this guide, fluvial refers to all flowing water deposits regardless of age or time since deposition.

Forest – in this guide, sites which can (and normally do) support a minimum of 30% crown closure by trees.

Forest floor – a general term encompassing the layer of undecomposed organic matter (leaves, twigs and plant remains in various stages of decomposition) lying on top of the mineral soil (Dunster and Dunster 1996). Often referred to as the duff layer.

Frequent natural disturbance – see Natural disturbance regime.

Gap disturbance – see Natural disturbance regime.

Glacial till – see Parent material.

Glaciofluvial – see Parent material.

Gleyed – a soil condition achieved when soils are under water saturation and prolonged anaerobic conditions. It is a condition generally associated with high water tables or saturation over a relatively impermeable layer (Cauboue et al. 1996). Gleyed is an older term replaced by redoximorphic features (redox features) in more current literature.

Hardwood – See Covertype.

Hybrid spruce – in Nova Scotia a natural cross between red spruce and black spruce displaying features of both.

Infrequent natural disturbance – see Natural disturbance regime.

Intermediate – in reference to shade tolerance, a condition between intolerant and tolerant. Also see Crown class.

Intolerant – refers to shade tolerance and defines a condition whereby trees are not capable of successfully growing beneath the shading canopy of other or similar species.

Karst – surface and subsurface features created by the dissolving of soluble rock such as limestone and gypsum which results in features such as caverns and sinkholes (Cauboue et al. 1996). In this guide, karst sites are limited to those which have gypsum or limestone bedrock exposures in addition to sinkholes and/or caverns.

Krummholz – scrubby and stunted growth form in trees, often forming a characteristic zone at the limit of tree growth in mountains (Cauboue et al. 1996) or along coastlines and high elevation plateaus.

Lacustrine – see Parent material.

Landscape – an expanse of land with landforms, land cover, habitats and natural features which are repeated in similar form and that, taken together, form a composite (Dunster and Dunster 1996).

Layering – a form of vegetative reproduction where a branch buried in the forest floor develops roots and becomes independent of the parent tree (Dunster and Dunster 1996).

Mafic – referring to igneous rock composed chiefly of dark, ferromagnesian minerals (AGI 1984) (i.e. basalt and gabbro).

Marine – see Parent material.

Matrix forest – a widespread forest community which dominates the landscape and forms the background in which other smaller scale communities occur (Thompson 2002).

Indian cucumber root

Mesic – describes sites with average moisture conditions for a given climate (Cauboue et al. 1996).

Microtopography – refers to the expression of mound and pit surface terrain within a forest stand, the main cause being the uprooting and subsequent decay of trees. In this guide, microtopography classes are:

Level: Few or no mounds, or mounds less than 0.3 m high.

Slightly: Mounds 0.3-1 m high and more than 7 m apart.

Moderately: Mounds 0.3-1 m high and 3-7 m apart.

Strongly: Mounds 0.3-1 m high and 1-3 m apart.

Severely: Mounds 0.3-1 m high and 0.3-1 m apart.

Extremely: Mounds more than 1 m high and more than 3 m apart.

Ultra: Mounds more than 1 m high and less than 3 m apart.

Mixedwood – See Covertype.

Moisture regime – represents average moisture in the soil available for plant growth. It is assessed by integrating moisture supply (as related to climate) with soil drainage and moisture holding capacities.

Mottles – spots or blotches of different colours or shades of colours interspersed with the dominant background colour, usually the result of alternating aerobic and anaerobic soil conditions and indicative of restricted drainage (Cauboue et al. 1996). Mottle is an older term replaced by redoximorphic features (redox features) or redoxmorphic concentrations (redox concentrations) in more current literature.

Mycorrhizal – the symbiotic relationship between the mycelium of a fungus and the roots of a host plant in which energy, water and nutrients flow between the two organisms.

Natural disturbance – a natural force that causes significant change in forest stand structure and/or composition such as fire, wind, flood, insect damage, or disease.

Natural disturbance regime – the frequency and type of natural disturbances that influence the arrangement of forested ecosystems and their biodiversity on a given landscape. Three disturbance regimes recognized in Nova Scotia are:

Frequent: Disturbances which result in the rapid mortality of an existing stand and the establishment of a new stand of relatively even age. The time interval between stand initiating events typically occurs more frequently than the longevity of the climax species that would occupy the site – therefore, evidence of gap dynamics and understory recruitment is usually absent. This regime results in the establishment and perpetuation of early to mid successional vegetation types.

Infrequent: Stand initiating disturbances which result in the rapid mortality of an existing stand and the establishment of a new stand of relatively even-age but the time interval between disturbance events is normally longer than the average longevity of the dominant species – thereby allowing gap dynamics and understory recruitment to evolve and become evident (eventually creating uneven-aged stands). This regime generally leads to the establishment and/or perpetuation of mid to late successional vegetation types.

Gap replacement: Stand initiating disturbances are rare. Instead, disturbances are characterized by gap and small patch mortality, followed by understory recruitment, resulting in stands with multiple age classes. This regime generally leads to the establishment and/or perpetuation of late successional vegetation types.

Nutrient regime – represents the relative availability of nutrients in the soil for plant growth. Determination of nutrient regime requires consideration and integration of several environmental features including forest floor humus form, soil type, seepage class and ground water characteristics.

Old growth – climax forests in the late stage of natural succession, the shifting mosaic phase, marked by mature canopy processes of gap formation and recruitment from a developed understory. Typical characteristics include a multi-layered canopy of climax species containing large old trees, decadent wolf trees and abundant snags and coarse woody debris. In Nova Scotia stands older than 125 years are classed as old growth.

Open woodland – in this guide, upland sites which (due to natural disturbances and/or site conditions) are generally limited to less than 30% crown closure by trees.

Organic – A substance derived from living organisms or their products (Dunster and Dunster 1996). Also see Parent material.

Organic/Bedrock – see Parent material.

Overstory – refers to trees which occupy dominant, co-dominant and intermediate canopy positions.

Parent material – the unconsolidated and more or less chemically unweathered material from which a soil develops by soil formation (pedogenic) processes (Cauboue et al. 1996). Parent material types found in Nova Scotia include (adapted from ECSS 1983):

Aeolian: Material deposited by wind action. Aeolian deposits are usually high in silt and/or fine sand and may show internal structures such as cross-bedding.

fire scar on red pine

Alluvium: Sediments deposited by streams and rivers (floodplains, deltas, etc.). These deposits are younger than glacial deposits and may or may not contain rock (gravel/cobbles).

Colluvium: Deposits of sand, silt, clay, organic matter and/or rock which have reached their position by gravity-induced movement.

Glacial Till: Unstratified deposits of sand, silt, clay and rock which have been released from glacier ice. Some glacial deposits also have recognizable landform features such as drumlins.

Glaciofluvial: Deposits which were partly or wholly stratified by glacial meltwater. Glaciofluvial deposits are often high in sand and/or gravel.

Lacustrine: Sediments deposited in quiet waters (lakes and ponds) which may or may not have been directly associated with glaciers. These deposits tend to be high in silt and clay and generally do not contain rock.

Marine: Sediments deposited in salt or brackish water or through shoreline processes. Marine deposits are generally stratified, of variable texture, and may contain shells and gravel.

Organic: Built up plant debris which does not easily decompose because of high moisture and low soil temperatures.

Organic/Bedrock: Combination of upland organic over weathered, near-surface bedrock.

Till/Bedrock: Combination of thin glacial till over weathered, near-surface bedrock.

Patch forest – a discrete forest community nested within a matrix forest. Both large and small patches are associated with ecological processes or environmental conditions, but small patches usually have several processes and conditions come together in a very precise way (Thompson 2002).

Percent cover – is the vertical projection of tree crown or plant shoot area as a percentage of stand area (Dunster and Dunster, 1996).

Riparian – refers to terrain, vegetation, or simply position adjacent to or associated with a stream, floodplain, or standing waterbody (Cauboue et al. 1996).

Seepage – in this guide, all lateral subsurface water flow (includes precipitation and spring sources).

Senescence – generally, the process of aging in mature individuals (trees), typical toward the end of an organism's life (Dunster and Dunster 1996).

Sinkhole – a funnel-shaped depression common in karst topography caused by the dissolving of underlying limestone or gypsum bedrock.

Slope Gradient – describes the percentage of vertical rise relative to horizontal distance. Zero percent slope describes a level site and 100% slope equates to a 45 degree angle. In this guide, slope classes are:

Level 0-3% Gentle 4-15% Moderate 16-30% Steep 31-60% Extreme >60%.

Slope Position – describes the relative slope position of a site within the landscape. Position classes are (adapted from ECSS 1983):

Crest: The generally convex upper most portion of a hill, it is usually convex in all directions with no distinct aspect.

Upper: The upper portion of a hill immediately below the crest - it has a convex surface profile with a specific aspect.

Middle: The area of a hill between the upper slope and lower slope with a specific aspect.

Lower: The area toward the base of a hill with a specific aspect.

Toe: The area below the lower slope usually demarcated by an abrupt leveling of the slope.

Depression: An area that is concave in all directions, generally at the foot of a hill or in a level area.

Level: Any level area not immediately adjacent to a hill. The surface profile is generally horizontal with no aspect. Level areas can be lower or upper elevations.

Snags – in this guide, dead trees larger than 7.5 cm in diameter at breast height (1.3 m) and standing at 45 degrees or more.

Softwood – See Covertype.

Spring ephemerals – any of various species of wildflowers that bloom in the early spring for only a few weeks and then quickly die back.

Stand – in the case of forests, a group of trees in a specific area which are sufficiently uniform in composition, age, arrangement and condition to be distinguishable from adjacent forest areas (Dunster and Dunster 1996).

Succession – an orderly process of community development that involves changes in species structure and community processes with time; it is reasonably directional and, therefore, predictable (Odum 1971).

Successional development – plant community development which proceeds through a number of distinct successional stages (e.g. early, middle, late) that replace one another in a predictable sequence.

Super canopy – a canopy position above the normal overstory/canopy layer.

Barred owl

Talus – a form of colluvium deposit, characterized by excessive surface stoniness, usually found at the base of steep slopes or cliffs (Dunster and Dunster 1996).

Talus slopes – a slope of about 35 degrees (the natural angle of rest for non-cohesive rock fragments) and underlain by talus (Dunster and Dunster 1996).

Temperate – having a climate intermediate between tropical and polar; moderate or mild in temperature; having four seasons.

Till/Bedrock – see Parent material.

Tolerant – refers to shade tolerance and defines a condition whereby trees are capable of successful growth and reproduction beneath the shading canopy of other or similar species.

Understory – refers to vegetation growing below the overstory grouped into three categories:

Shrub layer: Woody stemmed species and regenerating trees usually less than 2 m in height, but occasionally taller.

Herb layer: Dwarf woody plants plus ferns, club mosses and other herbaceous plants.

Bryophytes and Lichens: Mosses, hornworts, liverworts and lichens.

Uneven-aged – describes a forest, stand, or vegetation type in which intermingling trees differ markedly in age.

Vernal Pools – a seasonal body of standing water that typically forms in the spring from melting snow and other runoff, dries out in the hotter months of summer, and often refills in the autumn.

Wave forest – a wave-like pattern of dead and living trees found on highly exposed sites and created by wind damage and subsequent mortality.

Windthrow – a disturbance where a tree (or trees) has been uprooted by wind. Over time, windthrow leads to the development of mound and pit microtopography. Windthrow is synonymous with blowdown.

Zonal climax forest – results when a forest community reflects regional climate norms and is not unduly affected by local extremes in site conditions.

Zonal site – in this guide, a site with conditions that could potentially support establishment of a zonal climax forest.

False morel (Gyromitra spp.)

Appendix B - Vegetation Type Synonomy Tables

Tables below present older vegetation types (VT) from regional documents (Keys et al. 2003; Neily et al. 2006, 2007) with their 2010 equivalents. Where two or more 2010 VT names are listed, this means earlier units were split into more discreet units based on additional data analysis. Appendix B contains synonomy tables listing old regional guide VT names and new 2010 equivalents. Vegetation type W24 (Hemlock – Red oak Forest) is no longer recognized as a separate VT.

Nova Scotia's Model Forest (2003)

Old VT Name	2010 VT
VT1 Black spruce, Cinnamon fern - Sphagnum	WC1
VT2 Black spruce, False holly - Wild raisin	SP7, WC2
VT3 Jack pine, Huckleberry, Crowberry	OW1
VT4 Black spruce, Huckleberry - Reindeer moss	OW2
VT5 Jack pine - Black spruce, Bracken	SP1
VT6 Red pine - Black spruce, Sphagnum	SP2
VT7 White pine - Black spruce, Bracken	SP4, SP5
VT8 Red spruce, Cinnamon fern - Sphagnum	WC5
VT9 Red spruce - Hemlock, Starflower	SH3
VT10 Red spruce - White pine, Bracken	SH4
VT11 Red spruce - Balsam fir, Schreber's moss	SH5
VT12 Red spruce - Balsam fir, Stair step moss	SH6
VT13 White spruce - Tamarack, Old field	OF1, OF2
VT14 Red maple - Balsam fir, Sensitive fern	WD6
VT15 Tamarack - Black spruce, Sedge	WC7
VT16 Hemlock - Red spruce, Wild lily-of-the-valley	SH1
VT17 Balsam fir - Red maple, Wood sorrel	MW4
VT18 Red oak - White pine - Hemlock	KA1
VT19 Yellow birch - Red spruce, Wood fern	MW1
VT20 Maple - Yellow birch, New York fern	TH2
VT21 Sugar maple - White ash, Christmas fern	TH3
VT22 Sugar maple - Yellow birch, Hay scented fern	TH1
VT23 Red maple, Sedge - Violet	WD3

VT24 Aspen, Honeysuckle - Wood aster	IH3, IH4
VT25 Red maple - Aspen, Bunchberry	IH6a
VT26 Red maple - White birch, Sarsaparilla	IH6
VT27 Red maple, Hay-scented fern - Wood sorrel	IH7
VT28 White ash - Sugar maple, Ostrich fern	FP1

Western Ecoregion (2006)

Old VT Name	2010 VT
W1 Black spruce, Cinnamon fern - Sphagnum Wet Forest	WC1
W2 Black spruce, False holly Wet Forest	SP7, WC2
W3 Red spruce, Cinnamon fern - Sphagnum Wet Forest	WC5
W4 Tamarack, Tussock sedge Wet Forest	WC7
W5 Cedar swamp	CE1
W6 Hemlock, Sphagnum Wet Forest	WC8
W7 White ash - Spruce, Cinnamon fern Wet Forest	WD7
W8 White ash, Jewelweed Wet Forest	WD1
W9 Red maple - Red oak, Cinnamon fern Wet Forest	WD2
W10 Red maple, Alder, Sphagnum Wet Forest	WD3
W11 Red maple, Poison ivy Wet Forest	WD4
W12 Black spruce, Bracken Forest	SP5
W13 Red pine Forest	SP2
W14 Red pine - White pine, Mayflower Forest	SP3
W15 White pine Forest	SP4
W16 Red spruce, Schreber's moss Forest	SH5
W17 Red spruce - Balsam fir, Stair-step moss Forest	SH6
W18 Red spruce - White pine, Bracken Forest	SH4
W19 Red spruce - Hemlock - White pine Forest	SH3
W20 Hemlock Forest	SH1
W21 Hemlock - White pine Forest	SH2
W22 Balsam fir - White pine, Schreber's moss Forest	SH9
W23 Red oak - White pine, Teaberry Forest	SP9
W24 Hemlock - Red oak Forest	No Equivalent
W25 Balsam fir - Red maple, Goldthread Forest	MW4

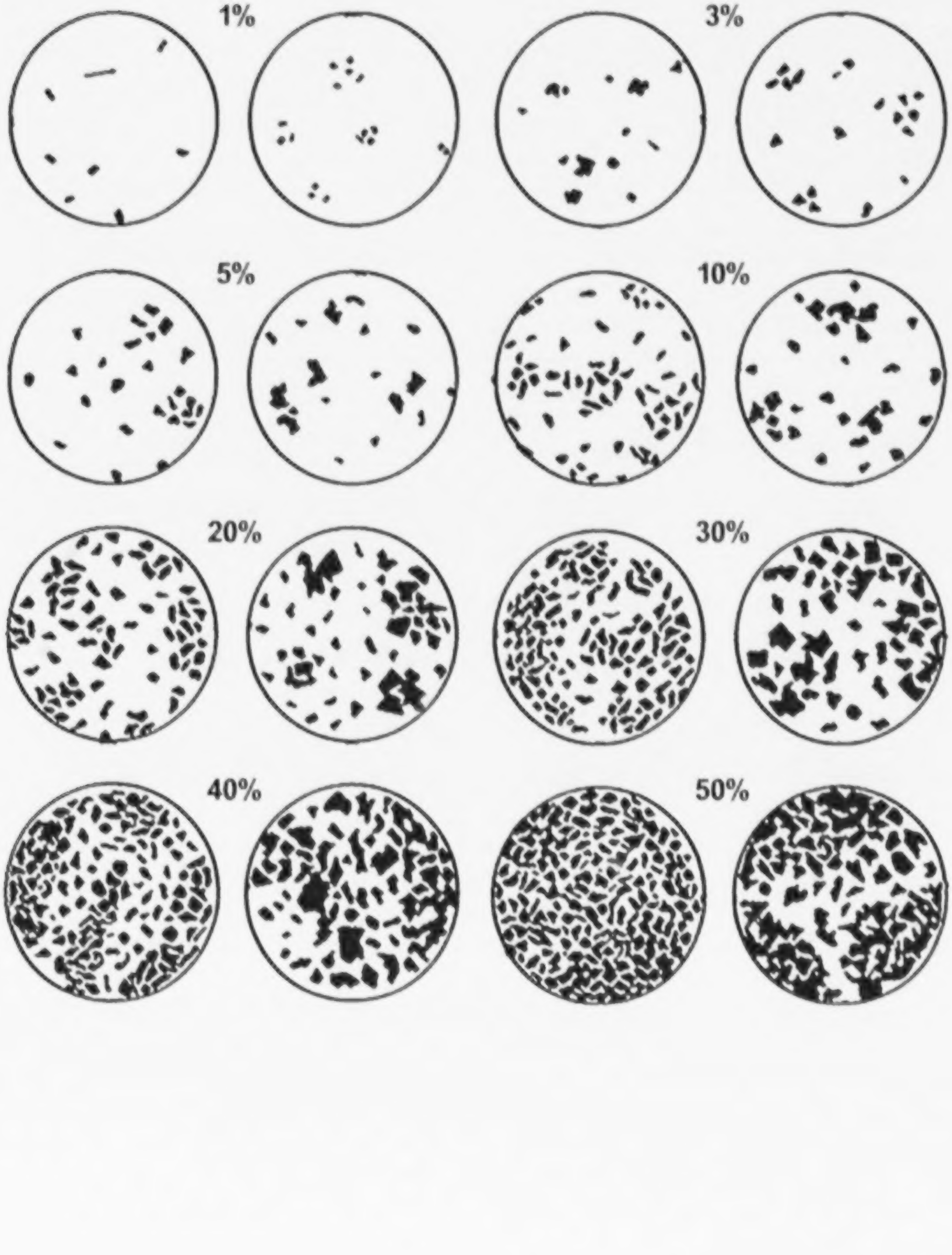
W26 Red spruce - Yellow birch, Wood fern Forest	MW1
W27 Poor Largetooth aspen Forest	IH1
W28 Rich Largetooth aspen Forest	IH3
W29 White birch - Red maple Forest	IH6
W30 Red oak - Red maple, Witch hazel - Princess pine Forest	IH2
W31 Red oak Forest	IH2a
W32 Sugar maple - White ash, Christmas fern Forest	TH3
W33 Sugar maple - Yellow birch, Hay scented fern Forest	TH1
W34 Red oak - Northern Hardwood Forest	TH6
W35 Beech Forest	TH5
W36 Red oak, Teaberry - Lichen Woodland	OW5
W37 Black spruce, Huckleberry - Lichen Woodland	OW2
W38 Spruce - Pine Rocky Woodland	OW2
W39 Old field, Conifer Forest	OF1, OF2, OF3

Northeast Nova Scotia (2007)

Old VT Name	2010 VT
E1 Red spruce, Cinnamon fern - Sphagnum Wet Forest	WC5
E2 Black spruce, Cinnamon fern - Sphagnum Wet Forest	WC1
E3 Black spruce, False holly	SP7, WC2
E4 Black spruce - Jack pine Wet Forest	WC3
E5 Balsam fir, Cinnamon fern Wet Forest	WC6
E6 Tamarack, Labrador tea, Sphagnum Wet Forest	WC7
E7 Red maple - Balsam fir, Sensitive fern	WD6
E8 White ash - Spruce, Cinnamon fern Wet Forest	WD7
E9 White ash, Jewelweed Wet Forest	WD1
E10 White ash - Sugar maple, Ostrich fern Floodplain Forest	FP1
E11 Red maple Floodplain Forest	FP2, FP3
E12 Balsam poplar Floodplain Forest	FP4
E13 Black cherry Floodplain Forest	FP5
E14 White spruce Floodplain Forest	FP6
E15 Old field, White spruce Forest	OF1
E16 Old field, White spruce - Tamarack Forest	OF2

E17 Old field, White pine Forest	OF3
E18 Old field, Balsam fir Forest	OF4
E19 Coastal Black spruce, Mountain-ash Forest	CO1
E20 Black spruce - White pine, Bracken	SP4, SP5
E21 Jack pine - Black spruce, Teaberry	SP1
E22 Red pine Forest	SP2
E23 Red spruce - Balsam fir, Stair-step moss	SH6
E24 Red spruce, Schreber's moss	SH5
E25 Red spruce - White pine, Bracken	SH4
E26 Red spruce - Hemlock - White pine	SH3
E27 Hemlock Forests	SH1
E28 Coastal Balsam fir Forest	CO4
E29 Balsam fir Forests (in part)	HL1
E29 Balsam fir Forests (in part)	SH8
E30 Red spruce - Yellow birch, Wood fern Forest	MW1
E31 Hemlock - Yellow birch, Christmas fern Forest	MW3
E32 Balsam fir - Red maple, Goldthread Forest	MW4
E33 Yellow birch - Balsam fir Highlands Forest	HL3
E34 Poor Largetooth aspen Forest	IH1
E35 Trembling aspen Seral Forest	IH4, IH5
E36 Red maple, Hay-scented fern - Wood aster Forest	IH7
E37 White birch - Red maple	IH6
E38 Red maple - White birch Coastal Forest	CO6
E39 Sugar maple - Yellow birch, Hay-scented fern	TH1, TH2
E40 Sugar maple - White ash, Christmas fern	TH3
E41 Sugar maple - White ash, Silvery Spleenwort Forest	TH4
E42 Beech Forest	TH5
E43 Red maple - Yellow birch, Striped maple Forest	TH8
E44 White and Yellow birch Highlands Forest	HL4
E45 Yellow and White birch, Evergreen wood fern Forest	TH7
E46 Jack pine, Huckleberry - Crowberry Woodland	OW1
E47 Black spruce, Huckleberry - Lichen Woodland	OW2

Appendix C - Charts for estimating percent vegetation cover (Terry and Chilingar 1955)



Appendix D - Scientific and Common Names

Plants

Vascular Plants

Common Name	***Scientific Name***
Adder's-tongue	*Ophioglossum pusillum*
Agrimony	*Agrimonia spp*
Alder leaved buckthorn	*Rhamnus alnifolia*
Allegheny hawkweed	*Hieracium paniculatum*
Alternate leaved dogwood	*Cornus alternifolia*
Anise root	*Osmorhiza longistylis*
Arrowleaved violet	*Viola sagittata*
Balsam fir	*Abies balsamea*
Balsam poplar	*Populus balsamifera*
Baltic rush	*Juncus arcticus*
Bayberry	*Myrica pensylvanica*
Beach grass	*Ammophila breviligulata*
Beaked hazelnut	*Corylus cornuta*
Bearberry	*Arctostaphylos uva-ursi*
Bedstraw	*Galuim spp.*
Beech	*Fagus grandifolia*
Beech drops	*Epifagus virginiana*
Bellwort	*Uvularia sessilifolia*
Bent-grass	*Agrostis spp.*
Bittersweet	*Solanum dulcamara*
Black ash	*Fraxinus nigra*
Black cherry	*Prunus serotina*
Black chokeberry	*Aronia melanocarpa*
Black crowberry	*Empetrum nigrum*
Black snakeroot	*Sanicula marilandica*
Black spruce	*Picea mariana*
Bladder sedge	*Carex intumescens*
Bloodroot	*Sanguinaria canadensis*
Blue cohosh	*Caulophyllum thalictroides*
Blue flag	*Iris versicolor*
Blue joint	*Calamagrostis canadensis*
Bluebead lily	*Clintonia borealis*
Blunt leaved bedstraw	*Galium obtusum*
Bog-goldenrod	*Solidago uliginosa*
Bracken	*Pteridium aquilinum*
Braun's holly fern	*Polystichum braunii*
Bristle stalked sedge	*Carex leptalea*
Bristly black currant	*Ribes lacustre*
Bristly club moss	*Lycopodium annotinum*
Brome-like sedge	*Carex bromoides*
Broom crowberry	*Corema conradii*
Brownish sedge	*Carex brunnescens*
Bugleweed	*Lycopus uniflorus*
Bulbet bladder fern	*Cystopteris bulbifera*
Bunchberry	*Cornus canadensis*
Bush-honeysuckle	*Diervilla lonicera*
Button sedge	*Carex bullata*
Calico aster	*Aster lateriflorus*
Canada bluegrass	*Poa compressa*
Canada goldenrod	*Solidago canadensis*
Canada lily	*Lilium canadense*
Canada mountain-ricegrass	*Oryzopsis canadensis*
Canada wood-nettle	*Laportea canadensis*
Case's ladies' tresses	*Spiranthes casei*
Catbriar	*Smilax rotundifolia*
Checkered rattlesnake plantain	*Goodyera tesselata*
Choke cherry	*Prunus virginiana*
Chokeberries	*Aronia spp.*
Christmas fern	*Polystichum acrostichoides*
Cinnamon fern	*Osmunda cinnamomea*
Cinquefoil	*Potentilla simplex*
Coltsfoot	*Tussilago farfara*
Common blackberry	*Rubus allegheniensis*
Common hair grass	*Deschampsia flexuosa*
Common speedwell	*Veronica officinalis*
Common woodrush	*Luzula multiflora*
Cow-parsnip	*Heracleum lanatum*
Cow wheat	*Melampyrum lineare*
Creeping bent-grass	*Agrostis stolonifera*
Creeping buttercup	*Ranunculus repens*
Creeping rattlesnake plantain	*Goodyera repens*
Creeping snowberry	*Gaultheria hispidula*
Crested wood fern	*Dryopteris cristata*
Cut leaved avens	*Geum laciniatum*
Dandelion	*Taraxacum officinale*
Dewey's sedge	*Carex deweyana*
Dog tooth violet	*Erythonium americanum*
Downy alder	*Alnus viridis*
Downy rattlesnake plantain	*Goodyera pubescens*
Drooping wood sedge	*Carex arctata*
Dutchman's breeches	*Dicentra cucullaria*
Dwarf mistletoe	*Arceuthobium pusillum*
Dwarf raspberry	*Rubus pubescens*

Common Name	Scientific Name
Early leaf brome grass	*Bromus latigumis*
Eastern spreading wood fern	*Dryopteris campyloptera*
Eastern white cedar	*Thuja occidentalis*
Elliott's goldenrod	*Solidage elliottii*
Elm	*Ulmus americana*
Evening primrose	*Oenothera biennis*
Evergreen wood fern	*Dryopteris intermedia*
False holly	*Nemopanthus mucronatus*
False nettle	*Boehmeria cylindrica*
False Solomon's seal	*Smilacina racemosa*
False violet	*Dalibarda repens*
Fibrous-root sedge	*Carex communis*
Field horsetail	*Equisetum arvense*
Fireweed	*Epilobium angustifolium*
Fly-honeysuckle	*Lonicera canadensis*
Foamflower	*Tiarella cordifolia*
Fowl manna grass	*Glyceria striata*
Fowl meadow grass	*Poa palustris*
Foxberry	*Vaccinium vitis-idaea*
Fringed sedge	*Carex crinita*
Giant rattlesnake plantain	*Goodyera oblongifolia*
Golden ragwort	*Senecio aureus*
Goldenrods	*Solidago spp.*
Goldthread	*Coptis trifolia*
Gooseberry family	*Ribes spp.*
Graceful sedge	*Carex gracillima*
Grey birch	*Betula populifolia*
Ground cedar	*Diphasiastrum tristachyum*
Ground hemlock (Yew)	*Taxus canadensis*
Ground juniper	*Juniperus communis*
Ground pine	*Lycopodium obscurum*
Hair fescue	*Festuca filiformis*
Hairy sedge	*Carex hirtifolia*
Hairy sweet cicely	*Osmorhiza claytoni*
Hare-bell	*Campanula rotundifolia*
Hawkweeds	*Hieracium spp.*
Hawthorns	*Crataegus spp.*
Hay-scented fern	*Dennstaedtia punctilobula*
Heart-leaf birch	*Betula cordifola*
Heart-leaved aster	*Aster cordifolius*
Helliborine	*Epipactis helleborine*
Hemlock	*Tsuga canadensis*
Hemp-nettle	*Galeopsis tetrahit*
Herb-Robert	*Geranium robertianum*
Hickey's club-moss	*Lycopodium hickey*
Highbush blueberry	*Vaccinium corymbosum*
Highbush cranberry	*Viburnum opulus*
Hobble-bush	*Viburnum alniifolium*
Hooked agrimony	*Agrimonia gryposepala*
Horse-gentian	*Triosteum aurantiacum*
Huckleberry	*Gaylussacia baccata*
Hudsonia	*Hudsonia ericoides*
Hybrid spruce	*Picea rubens x Picea mariana*
Hyssop-leaved fleabane	*Erigeron hyssopifolius*
Indian cucumber root	*Medeola virginiana*
Indian pipe	*Monotropa uniflora*
Inkberry	*Ilex glabra*
Interrupted fern	*Osmunda claytoniana*
Ironwood	*Ostrya virginiana*
Jack pine	*Pinus banksiana*
Jack-in-the-pulpit	*Arisaema triphyllum*
Jewelweed	*Impatiens capensis*
Kentucky bluegrass	*Poa pratensis*
Labrador tea	*Ledum groenlandicum*
Lady fern	*Athyrium filix-femina*
Lambkill	*Kalmia angustifolia*
Lance-leaved grapefern	*Botrychium lanceolatum*
Large cranberry	*Vaccinium macrocarpon*
Large enchanter's nightshade	*Circaea lutetiana*
Large-leaved aster	*Aster macrophyllus*
Large-leaved goldenrod	*Solidago macrophylla*
Large-tooth aspen	*Populus grandidentata*
Late goldenrod	*Solidago gigantea*
Leather-leaf	*Chamaedaphne calyculata*
Leatherwood	*Dirca palustris*
Lions paw	*Prenanthes trifoliolata*
Little grapefern	*Botrychium simplex*
Live-forever	*Sedum telephium*
Long-bracted green orchid	*Coeloglossum viride*
Long-stalked sedge	*Carex pedunculata*
Loosetrife	*Lysimachia terrestris*
Lowbush blueberry	*Vaccinium angustifolium*
Maidenhair spleenwort	*Asplenium trichomanes*
Male fern	*Dryopteris felix-mas*
Manna-grass	*Glyceria spp*
Marginal wood fern	*Dryopteris marginalis*
Marsh fern	*Thelypteris palustris*
Massachusetts fern	*Thelypteris simulata*
Mayflower	*Epigaea repens*
Meadow hawkweed	*Hieracium caespitosum*
Meadow horsetail	*Equisetum palustre*
Meadow-rue	*Thalictrum pubescens*

Common Name	**Scientific Name**
Meadow-sweet	*Spiraea alba*
Millet grass	*Milium effusum*
Mitrewort	*Mitella nuda*
Mountain maple	*Acer spicatum*
Mountain sandwort	*Arenaria groenlandica*
Mountain ash	*Sorbus americana*
Mouse eared hawkweed	*Hieracium pilosella*
New England sedge	*Carex novae-angliae*
New York aster	*Aster novi-belgii*
New York fern	*Thelypteris noveboracensis*
Nodding trillium	*Trillium cernuum*
Northern beech fern	*Phegopteris connectilis*
Northern long sedge	*Carex folliculata*
Northern wild licorice	*Galium kamtschaticum*
Oak fern	*Gymnocarpium dryopteris*
Old field goldenrod	*Solidago nemoralis*
Ostrich fern	*Matteuccia struthiopteris*
Ox-eye daisy	*Chrysanthemum leucanthemum*
Painted trillium	*Trillium undulatum*
Pale laurel	*Kalmia polifolia*
Partridge berry	*Mitchella repens*
Pearly everlasting	*Anaphalis margaritacea*
Philadelphia panic grass	*Panicum philadelph*
Pin cherry	*Prunus pensylvanica*
Pine barren goldenheather	*Hudsonia ericoides*
Pine-sap	*Monotropa hypopithys*
Pink lady's slipper	*Cypripedium acaule*
Pitcher-plant	*Sarracenia purpurea*
Poison ivy	*Toxicodendron radicans*
Poverty grass	*Danthonia spicata*
Princes'-pine	*Chimaphila umbellata*
Ram's head lady's slipper	*Cypripedium arietinum*
Rattlesnake fern	*Botrychium virginianum*
Red baneberry	*Actaea rubra*
Red chokeberry	*Aronia arbutifolia*
Red crowberry	*Empetrum rubrum*
Red fescue	*Festuca rubra*
Red maple	*Acer rubrum*
Red oak	*Quercus rubra*
Red pine	*Pinus resinosa*
Red raspberry	*Rubus idaeus*
Red spruce	*Picea rubens*
Red-berried elder	*Sambucus racemosa*
Red-osier dogwood	*Cornus sericea*
Rhodora	*Rhododendron canadense*

Common Name	**Scientific Name**
Ribless woodland sedge	*Carex leptonervia*
Rice grass	*Oryzopsis asperifolia*
Rock polypody	*Polypodium virginianum*
Rock rose	*Helianthemum canadense*
Rose pogonia	*Pogonia ophioglossides*
Rose twisted stalk	*Streptopus roseus*
Roses	*Rosa spp.*
Rough aster	*Aster radula*
Rough bedstraw	*Galium asprellum*
Rough goldenrod	*Solidago rugosa*
Rough hawkweed	*Hieracium scabrum*
Round-leaved dogwood	*Cornus rugosa*
Round leaved pyrola	*Pyrola rotundifolia*
Round-leaved sundew	*Drosera rotundifolia*
Royal fern	*Osmunda regalis*
Running club-moss	*Lycopodium clavatum*
Rushes	*Juncus spp.*
Rusty woodsia	*Woodsia ilvensis*
Sarsaparilla	*Aralia nudicaulis*
Scotch pine	*Pinus sylvestris*
Sedges	*Carex spp.*
Sensitive fern	*Onoclea sensibilis*
Serviceberry	*Amelanchier spp.*
Sheep-sorrel	*Rumex acetosella*
Shepherdia	*Shepherdia canadensis*
Shining club-moss	*Huperzia lucidula*
Shinleaf	*Pyrola elliptica*
Short husk	*Brachyelytrum erectum*
Showy lady's slipper	*Cypripedium reginae*
Silver poplar	*Populus alba*
Silvery spleenwort	*Deparia acrostichoides*
Skunk cabbage	*Symplocarpus foetidus*
Small bedstraw	*Galium tinctorium*
Small cranberry	*Vaccinium oxycoccus*
Small enchanter's nightshade	*Circaea alpina*
Small flowered wood rush	*Luzula parviflora*
Smooth serviceberry	*Amelanchier laevis*
Soft leaved sedge	*Carex disperma*
Solomon's seal	*Polygonatum pubesens*
Speckled alder	*Alnus incana*
Spinulose wood fern	*Dryopteris carthusiana*
Spreading sedge	*Carex projecta*
Spring beauty	*Claytonia caroliniana*
Squash berry	*Viburnum edule*
Staghorn sumac	*Rhus typhina*
Starflower	*Trientalis borealis*

Common Name	***Scientific Name***
Stiff sedge	*Carex stricta*
Stinking Willie	*Senecio jacobaea*
Strawberry	*Fragaria virginiana*
Striped maple	*Acer pensylvanicum*
Sugar maple	*Acer saccharum*
Sweet gale	*Myrica gale*
Sweetfern	*Comptonia peregrina*
Sweet-scented bedstraw	*Galium triflorum*
Tall buttercup	*Ranunculus acris*
Tall white aster	*Aster umbellatus*
Tamarack	*Larix laricina*
Teaberry	*Gaultheria procumbens*
Thimbleweed	*Anemone virginiana*
Three seeded sedge	*Carex trisperma*
Three-leaved false Solomon's seal	*Smilacina trifolia*
Three-toothed cinquefoil	*Potentilla tridentata*
Trailing blackberry	*Rubus hispidus*
Trembling aspen	*Populus tremuloides*
Twinflower	*Linnaea borealis*
Umbel-like sedge	*Carex umbellata*
Velvet-leaf blueberry	*Vaccinium myrtilloides*
Violets	*Viola spp.*
Virginia chain fern	*Woodwardia virginica*
Virgins bower	*Clematis virginiana*
Water-horehound	*Lycopus americanus*
Western poison ivy	*Toxicodendron rydbergii*
White ash	*Fraxinus americana*
White avens	*Geum canadense*
White baneberry	*Actaea alba*
White birch	*Betula papyrifera*
White goldenrod	*Solidage bicolor*
White lettuce	*Prenanthes altissima*
White panicle aster	*Aster lanceolatus*
White pine	*Pinus strobus*
White spruce	*Picea glauca*
White twisted stock	*Streptopus amplexifolius*
White-haired panic grass	*Panicum villosissimum*
Wiegand's wild rye	*Elymus wiegandii*
Wild apple	*Pyrus Malus*
Wild carrot	*Daucus carota*
Wild leek	*Allium tricoccum*
Wild lily of the valley	*Maianthemum canadense*
Wild raisin	*Viburnum nudum*
Wild red currant	*Ribes triste*
Wild rose	*Rosa carolina*

Common Name	***Scientific Name***
Wild rye grass	*Elymus virginicus*
Willows	*Salix spp.*
Winterberry	*Ilex verticillata*
Witch-hazel	*Hamamelis virginiana*
Wood aster	*Aster acuminatus*
Wood goldenrod	*Solidago flexicaulis*
Wood reed	*Cinna latifolia*
Woodland horsetail	*Equisetum sylvaticum*
Wood-sorrel	*Oxalis acetosella*
Yarrow	*Achillea millefolium*
Yellow birch	*Betula alleghaniensis*
Yellow hawkweed	*Hieracium x floribundum*
Yellow lady's slipper	*Cypripedium calceolus*
Yellow violet	*Viola pubescens*
Yellow-green sedge	*Carex flava*

Non-Vascular Plants

Bryophytes

Atrichum moss	*Atrichum spp.*
Bazzania	*Bazzania trilobata*
Blunt-leaved sphagnum	*Sphagnum palustre*
Brachythecium moss	*Brachythecium spp.*
Brittle stem sphagnum	*Sphagnum wulfinum*
Broom moss	*Dicranum scoparium*
Brown fat-leaved sphagnum	*Sphagnum papillosum*
Common green sphagnum	*Sphagnum girgensohnii*
Dicranums	*Dicranum spp.*
Fern moss	*Thuidium delicatulum*
Fine sphagnum	*Sphagnum angustifolium*
Flat topped sphagnum	*Sphagnum fallax*
Goose neck moss	*Rhytidiadelphus loreus*
Hair-cap moss	*Polytrichum commune*
Hypnum moss	*Hypnum imponens*
Juniper polytrichum	*Polytrichum juniperinum*
Ladies' tresses	*Sphagnum capillifolium*
Mniums	*Mnium spp.*
Naugehyde liverwort	*Ptilidium pulcherrimum*
Pale fat leaved sphagnum	*Sphagnum centrale*
Pin cushion moss	*Leucobryum glaucum*
Plume moss	*Ptilium crista-castrensis*
Prickly sphagnum	*Sphagnum squarrosum*
Red fat leaved sphagnum	*Sphagnum magellanicum*
Rhizomniums	*Rhizomnium spp.*
Rhytidiadelphus moss	*Rhytidiadelphus spp.*

Common Name	***Scientific Name***
Russ's sphagnum	*Sphagnum russowii*
Schreber's moss	*Pleurozium schreberi*
Shaded wood moss	*Hylocomium umbratum*
Shaggy moss	*Rhytidiadelphus triquetrus*
Sphagnum moss	*Sphagnum spp.*
Sphagnum tenellum	*Sphagnum tenellum*
Stair step moss	*Hylocomium splendens*
Torrey's sphagnum	*Sphagnum torreyanum*
Wavy dicranum	*Dicranum polysetum*

Lichens

Artic kidney lichen	*Nephroma arcticum*
Boreal felt lichen	*Erioderma pedicellatum*
Coral lichen	*Sphaerophorus globosus*
Cup lichens	*Cladonia spp.*
Dixie reindeer lichen	*Cladina subtenuis*
Green reindeer lichen	*Cladina arbuscula*
Grey reindeer lichen	*Cladina rangiferina*
Lesser green reindeer lichen	*Cladina mitis*
Methuselah's beard lichen	*Usnea longissima*
Old man's beard	*Usnea spp.*
Star-tipped reindeer lichen	*Cladina stellaris*

Violet toothed polypore (Trichaptum biforme)

Common Name	***Scientific Name***

Animals

Birds

American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American redstart	*Setophaga ruticilla*
Barred owl	*Strix varia*
Bicknell's thrush	*Catharus bicknelli*
Black and white warbler	*Mniotilta varia*
Black-backed woodpecker	*Picoides arcticus*
Black-crowned night heron	*Nycticorax nycticorax*
Blackpoll warbler	*Dendroica striata*
Black-throated blue warbler	*Dendroica caerulescens*
Blue jay	*Cyanocitta cristata*
Boreal chickadee	*Poecile hudsonicus*
Canada warbler	*Wilsonia canadensis*
Chestnut-sided warbler	*Dendroica pensylvanica*
Chickadees	*Poecile spp.*
Common redpoll	*Acanthis flammea*
Common yellowthroat	*Geothlypis trichas*
Crossbills	*Loxia spp.*
Crow	*Corvus brachyrhynchos*
Evening grosbeak	*Coccothraustes vespertinus*
Finches	*Carpodacus spp.*
Fox sparrow	*Passerella iliaca*
Grey catbird	*Dumetella carolinensis*
Grey jay	*Perisoreus canadensis*
Great blue heron	*Ardea herodias*
Great crested flycatcher	*Myiarchus crinitus*
Great-horned owl	*Bubo virginianus*
Kinglets	*Regulus spp.*
Lincoln's sparrow	*Melospiza lincolnii*
Mourning warbler	*Oporornis philadelphia*
Northern goshawk	*Accipiter gentilis*
Northern oriole	*Icterus galbula*
Northern parula warbler	*Parula americana*
Northern waterthrush	*Seiurus noveboracensis*
Nuthatches	*Sitta spp.*
Olive-sided flycatcher	*Contopus cooperi*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapilla*
Pileated woodpecker	*Dryocopus pileatus*

Common Name	Scientific Name
Pine siskin	*Spinus pinus*
Purple finch	*Carpodacus purpureus*
Raven	*Corvus corax*
Red crossbill	*Loxia curvirostra*
Red-tailed hawk	*Buteo jamaicensis*
Ruby-throated hummingbird	*Archilochus colubris*
Ruffed grouse	*Bonasa umbellus*
Rusty blackbird	*Euphagus carolinus*
Sharp-shinned hawk	*Accipiter striatus*
Sharp-tailed sparrow	*Ammodramus caudacutus*
Solitary vireo	*Vireo solitarius*
Spruce grouse	*Falcipennis canadensis*
Swamp sparrow	*Melospiza georgiana*
Veery	*Catharus fuscescens*
Vesper sparrow	*Pooecetes gramineus*
White-winged crossbill	*Loxia leucoptera*
Wilson's warbler	*Wilsonia pusilla*
Wood thrush	*Hylocichla mustelina*
Woodcock	*Scolopax minor*
Yellow warbler	*Dendroica petechia*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-rumped warbler	*Dendroica coronata*

Amphibians and Reptiles

Blue-spotted salamander	*Ambystoma laterale*
Four-toed salamander	*Hemidactylium scutatum*
Red-backed salamander	*Plethodon cinereus*
Ribbon snake	*Thamnophis sauvitus septentrionalis*
Wood frog	*Rana sylvatica*
Wood turtle	*Glyptemys insculpta*
Yellow-spotted salamander	*Ambystoma maculatum*

Invertebrates

Balsam fir woolly adelgid	*Adelges piceae*
Forest tent caterpillar	*Malacosoma disstria*
Larch casebearer	*Coleophora laricella*
Larch sawfly	*Pristiphora erichsonii*
Spruce bark beetle	*Dendroctonus rufipennis*
Spruce budworm	*Choristoneura fumiferana*
Tent caterpillar	*Malacosoma disstria*
Tussock moth	*Orgyia leucostigma*
White pine weevil	*Pissodes strobi*

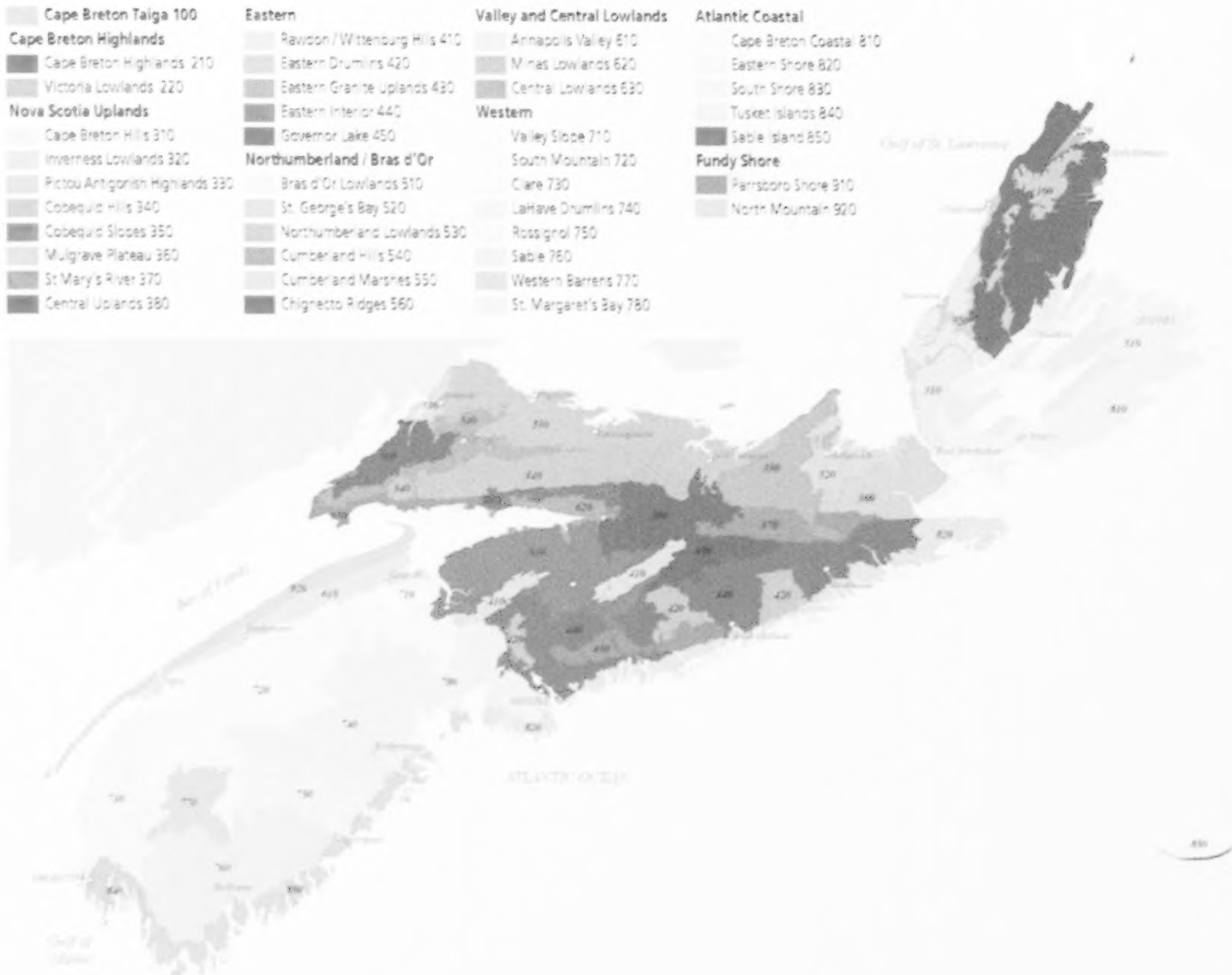
Mammals

Common Name	Scientific Name
American marten	*Martes americana*
Bear	*Ursus americanus*
Beaver	*Castor canadensis*
Canadian lynx	*Lynx canadensis*
Coyote	*Canis latrans*
Deer	*Odocoileus virginianus*
Fisher	*Martes pennanti*
Gaspé shrew	*Sorex gaspensis*
Long-tailed shrew	*Sorex dispar*
Mink	*Neovison vison*
Moose	*Alces americanus*
Muskrat	*Ondatra zibethicus*
Northern flying squirrel	*Glaucomys sabrinus*
Otter	*Lontra canadensis*
Porcupine	*Erethizon dorsatum*
Red fox	*Vulpes vulpes*
Red squirrel	*Tamiasciurus hudsonicus*
Rock vole	*Microtus chrotorrhinus*
Snowshoe hare	*Lepus americanus*
Southern flying squirrel	*Glaucomys volans*
Star-nosed mole	*Condylura cristata*
Water shrew	*Sorex palustris*

Fungi

Beech bark canker	*Neonectria faginata*
Beech scale disease	*Nectria ditissima*
Birch cinder conch	*Inonotus obliquus*
Black knot fungus	*Apiosporina morbosa*
Black trumpet mushrooms	*Craterellus fallax*
Boletes	*Boletaceae spp.*
Chanterelles	*Cantharellus cibarius*
Dutch elm disease	*Ophiostoma ulmi*
Hemlock varnish shelf	*Ganoderma tsugae*
Hollow foot suillus	*Suillus cavipes*
Honey mushooms	*Armillaria spp.*
Hypoxylon canker	*Hypoxylon mammatum*
Larch slippery jack	*Suillus grevillei*
Maitake (Hen of the woods)	*Grifola frondosa*
Pine mushrooms	*Tricholoma magnivelare*
Saffron milkcap	*Lactarius deliciousus*
Shoe-string root rot	*Armillaria spp.*
White pine blister rust	*Cronartium ribicola*

Appendix E - Ecoregions and ecodistricts of Nova Scotia


Cape Breton Taiga 100
Cape Breton Highlands
Cape Breton Highlands 210
Victoria Lowlands 220
Nova Scotia Uplands
Cape Breton Hills 310
Inverness Lowlands 320
Pictou Antigonish Highlands 330
Cobequid Hills 340
Cobequid Slopes 350
Mulgrave Plateau 360
St Mary's River 370
Central Uplands 380
Eastern
Rawdon / Wittenburg Hills 410
Eastern Drumlins 420
Eastern Granite Uplands 430
Eastern Interior 440
Governor Lake 450
Northumberland / Bras d'Or
Bras d'Or Lowlands 510
St. George's Bay 520
Northumberland Lowlands 530
Cumberland Hills 540
Cumberland Marshes 550
Chignecto Ridges 560
Valley and Central Lowlands
Annapolis Valley 610
Minas Lowlands 620
Central Lowlands 630
Western
Valley Slope 710
South Mountain 720
Clare 730
LaHave Drumlins 740
Rossignol 750
Sable 760
Western Barrens 770
St. Margaret's Bay 780
Atlantic Coastal
Cape Breton Coastal 810
Eastern Shore 820
South Shore 830
Tusket Islands 840
Sable Island 850
Fundy Shore
Parrsboro Shore 910
North Mountain 920
Gulf of St. Lawrence
ATLANTIC OCEAN

Appendix F - Snag volume functions

Snag volumes were estimated based on regression relationships derived from provincial inventory data (Townsend 2004). A cubic model was used to estimate individual snag volume based on diameter for both softwoods and hardwoods. Snag tree volume data were then combined with FEC prism plot data to estimate snag volumes on a per hectare basis.

Function:

$Y = b0 + (b1 \times dbh) + (b2 \times dbh2) + (b3 \times dbh3)$.

Where:

Y = total snag tree volume
dbh = snag tree diameter at 1.3 m
b0 = constant
b1, b2, b3 = coefficients

Softwood Results:

b0 = 0.043
b1 = - 0.010
b2 = 0.001
b3 = -5.239 E-6
r2 = 0.799

Hardwood Results:

b0 = -0.018
b1 = - 0.000
b2 = 0.000
b3 = -9.805 E-7
r2 = 0.813